TECHNICAL MANUAL

INSTALLATION, OPERATION, PRINCIPLES OF OPERATION,
MAINTENANCE, ILLUSTRATED PARTS BREAKDOWN,
AND SYSTEM DIAGRAMS

UNITED STATES
NATIONAL DATA CENTER

26 JULY 2001

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GLOSSARY

TERM	DEFINITION	TERM	DEFINITION
A/MIS	AFTAC Mission Information System	COTS	Commercial Off-the-Shelf
ADSN	AFTAC Distributed Subsurface Network	CPU	Central Processing Unit
		CSS	Center for Seismic Studies
AFTAC	Air Force Technical Applications Center	CTBT	Comprehensive Test Ban Treaty
AHQ	Alternate Headquarters	DACS	Distributed Applications Control System
AI	Area of Interest	DAM	Data Acquisition Manager
AOC	AFTAC Operations Center	DAS	Data Acquisition Subsystem
ARS	Analyst Review Station	DB	Database
ASCII	American Standard Code for Information Interchange	DBA	Database Administrator
ASN	AFTAC Southern Network	DFX	Detection and Feature Extraction Program
BARM	Broad Area Regional Monitoring	DIMM	Dynamic In-line Memory Module
BB	Broadband	DLMan	Diskloop Manager
C2	Command and Control (Guard)	DLT	Digital Linear Tape
CDE	Common Desktop Environment	DMS	Data Management Services
		DRAM	Dynamic Random Access Memory
CF	Complexity Factor	DSIMM	Dynamic Single In-line Memory Module
CMR	Center for Monitoring Research	DTC	Data Transaction Center
COL	Creates an Origin and Locates the origin	EEA	Event Evaluation Analyst
COLA	Creates an Origin, Locates the origin, and Aligns the channels	e-mail	Electronic Mail
		EP	Extremely Short Period
CommAgent	Communications Agent	GA	Global Association
ConnMan	Connection Manager	GAPL	Group Assembly Parts List

GLOSSARY (Cont)

TERM	DEFINITION	TERM	DEFINITION
GCI	Global Communication Interface	LFNET	Look-Forward Network Interval
GMT	Greenwich Mean Time (system time)	LIFO	Last-In-First-Out
GPM	Global Processing Mode	LP	Long Period
GSE	Group of Scientific Experts	LQ	Long Period Detection Love Wave
GUI	Graphical User Interface	LR	Long Period Detection Raleigh Wave
HAL	Hydroacoustic Analysis	LRU	Line Replaceable Unit
HDT	Hydrodisplay Tool	MDT	Message Data Terminal
HQ	Headquarters	MFR	Manufacturer
HYDR	Hydroacoustic Station Intervals	MP	Mid Period
HYDRO	Hydroacoustic	NDC	National Data Center
Hz	Hertz	NEIC	National Earthquake Information Center
ID	Identification	NET	Network
IDC	International Data Centre	NFS	Network File System
IMS	International Monitoring System	NHA	Next Higher Assembly
IP	Internet Protocol	NIS	Network Information Service
IPB	Illustrated Parts Breakdown	ns	Nanosecond
IPC	Interprocess Communication	NVRAM	Non-Volatile Random Access Memory
IRIS	Incorporated Research Institutions for Seismology	OAI	Outside Area of Interest
ITI	Identifying Technical Instruction	OCP	Operator Control Panel
LAN	Local Area Network	OPS	Operations
LANL	Los Alamos National Laboratory	PE	Preliminary Event
LED	Light Emitting Diode	Pipeline	Sequence of processes to be applied to a data stream

GLOSSARY (Cont)

TERM	DEFINITION	TERM	DEFINITION
PM	Process Manager	SOM	System Operations Manager
PMI/PMRs	Preventive Maintenance Instructions/Preventive Maintenance Routines	SP	Short Period
		SPOT	Spotlight Seismic Station Intervals
POC	Point of Contact	SQL	Structured Query Language
POST	Power-On Self-Test	TCP/IP	Transmission Control Protocol/Internet Protocol
Power off	Procedures performed on system hardware		
QC	Quality Control	TI	Technical Instruction
RAID	Redundant Array of Independent Disks	UCSD	University of California, San Diego
RDBMS	Relational Database Management System	UDP/IP	User Datagram Protocol/ Internet Protocol
REF. DES.	Reference Designation	UPS	Uninterruptible Power Supply
RT	Remote Terminal	US NDC	United States National Data Center
SAK	Secure Attention Key	USAEDS	United States Atomic Energy Detection System
SCSI	Small Computer System Interface	USGS	United States Geological Survey
SEA	Seismic Event Analyst	VLAN	Virtual Local Area Network
SEED	Scientific Exchange of Earthquake Data	VSIMM	Virtual Single In-line Memory Module
SEIS	Seismic Station Interval	VSN	Volume Serial Number
Shutdown	Procedures performed on system software	WAN	Wide Area Network
SIMM	Single In-line Memory Module	WFS	Waveform Server
		WS	Workstation
SMU	Southern Methodist University	ZAS	Zoom, Align, and Sort
SNL	Sandia National Laboratory		
SNR	Signal-to-Noise Ratio		

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INTRODUCTION

Due to the amount of information necessary to operate and maintain the United States National Data Center (US NDC), it was necessary to divide the technical instruction (TI) into two separate manuals. The manuals are divided into two categories: Operations (TI 2-NDC-1) and Maintenance (TI 2-NDC-2). Some chapters will only be contained in this manual, while others will appear in both manuals depending on their relationship to operations or maintenance.

Chapter 1 describes the equipment and its purpose in general terms. Publications related to operation of the equipment are also identified.

Chapter 2 contains installation and startup procedures.

Chapter 3 provides operating procedures required for maintenance of the US NDC.

Chapter 4 discusses the detailed principles of operation for each subsystem of the US NDC from a functional viewpoint. Also included is a description of the processes and data flow.

Chapter 5 contains troubleshooting procedures and removal and replacement procedures for proper maintenance of the US NDC hardware and software.

Chapters 6 presents the illustrated parts breakdown (IPB).

Chapter 7 contains US NDC diagrams.

STANDARD CONVENTIONS

UNIX Conventions

This documentation assumes some knowledge of the UNIX operating system which runs on the workstations. In this document, interactive (typed) input is shown in `Courier bold` font. Computer prompts and responses are presented in `Courier` font. Comments are added in parentheses in Helvetica font.   The symbol ↵ is used for <enter> or <return> for keyboard inputs. The following is an example of these formats:

`login:`   **`username`**↵ (Enter username)

Mouse Conventions

The workstation mouse has three buttons: left, middle, and right. In general, use the left mouse button unless specified otherwise.

UNIX File and Path Name Conventions

Throughout the document references to UNIX file names, as well as the path, will be specified in `Courier   font`   without italics. For example, `/adsn/config/ status_monitor.par` would refer to the status_monitor.par file in the /adsn/config directory.

Pull-down Menus

Some procedures contained throughout this document require the operator to select a pull-down menu, then select an item within that pull-down menu. When this occurs, the menu item to be selected by the operator appears in **Helvetica bold** font, immediately followed by a double arrow signifying the pull-down menu, immediately followed by the next selection also in **Helvetica bold** font. The following is an example of this format:

a. Select **File**⇒**Open**⇒**Latest Interval for AL1** in ARS.

Graphic Symbol Conventions

The following graphic symbols are used in the data flow diagrams contained in this manual.

Database File

External Entity

Program

Decision Block

Data Path
(Constant)

Data Path
(Not Constant)

SAFETY SUMMARY

This publication describes procedures which may require the use of chemicals, solvents, paints, or other commercially available material. The user of this publication should obtain the Material Safety Data Sheet (MSDS) Occupational Safety and Health Act (OSHA) Form 20 or equivalent from the manufacturers or suppliers of materials to be used. The user must become completely familiar with the manufacturer/supplier information and adhere to the procedures, recommendations, warnings, and cautions of the manufacturer/supplier for the safe use, handling, storage, and disposal of these materials.

The following are general safety precautions, sample icons, and instructions personnel must understand and apply during the many phases of operation and maintenance to ensure personal safety and health and the protection of Department of Defense (DOD) property.

HAZARDOUS MATERIALS

Warnings for hazardous materials are designed to warn personnel of hazards associated with such items when they come in contact with them during actual use. For each hazardous material used, a MSDS is required to be provided and available for review by users. Consult your local safety and health staff concerning any questions on hazardous chemicals, MSDSs, personal protective equipment requirements, and appropriate handling and emergency procedures.

WARNING AND CAUTION STATEMENTS

Warning and caution statements are strategically placed throughout this text prior to operating or maintenance procedures, practices, or conditions considered essential to the protection of personnel (WARNING) or equipment and property (CAUTION). A warning or caution will apply each time the related step is repeated. Prior to starting any task, the warning or caution included in the text for the task shall be reviewed and understood. The following are examples of warnings and cautions used throughout this document:

WARNING

This instrument produces lethal voltages. Remove all jewelry, watches, and wire rim glasses before working on this instrument. Ensure that power is disconnected before replacing any parts or performing maintenance. Procedures involving lethal voltages are identified by the following symbol:

CAUTION

HANDLING OF ELECTROSTATIC DISCHARGE SENSITIVE (ESDS) DEVICES

Electrostatic discharge sensitive (ESDS) devices must be handled with certain precautions that must be followed to minimize the effect of static build-up. Consult MIL-STD-1686B. Procedures involving ESDS devices are identified by the following symbol:

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CHAPTER 1

GENERAL INFORMATION

1-1.   INTRODUCTION.

1-2.   Chapter 1 provides general information for the United States National Data Center (US NDC).

1-3.   DESCRIPTION AND PURPOSE.

1-4.   The US NDC monitors geophysical data to verify compliance with the Comprehensive Test Ban Treaty (CTBT). Established and operated at the Air Force Technical Applications Center (AFTAC), the US NDC primary function is to support US national monitoring and verification capabilities. The US NDC also serves as a gateway between the US and the International Data Centre (IDC) for the exchange of geophysical data recorded by a global network of stations. The US NDC also provides the US academic communities and other authorized scientific organizations with readily accessible, high-quality data for conducting basic and applied research.

1-5.   The US NDC system accumulates seismic and hydroacoustic waveforms from sensors distributed worldwide. Once gathered, the waveforms are stored and archived for immediate and delayed processing. The US NDC provides a management capability for the raw waveforms, which allows the data to be analyzed using well-defined geophysical algorithms, and allows the timely detection and identification of man-made events (i.e., nuclear detonations).

1-6.   As shown in figure 1-1 and figure 1-2, the US NDC is composed of two systems, the Unclassified and Classified Systems, respectively.
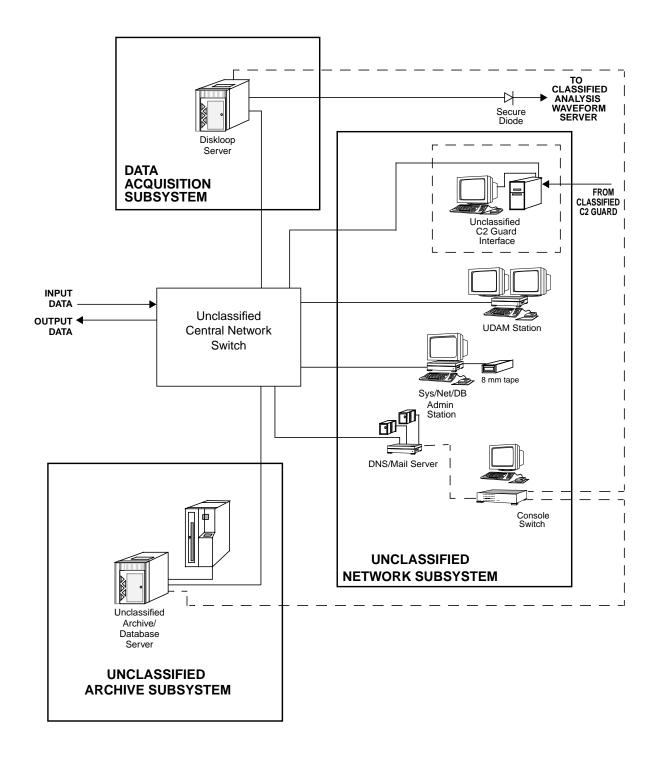
Figure 1-1. US NDC Unclassified System Connectivity
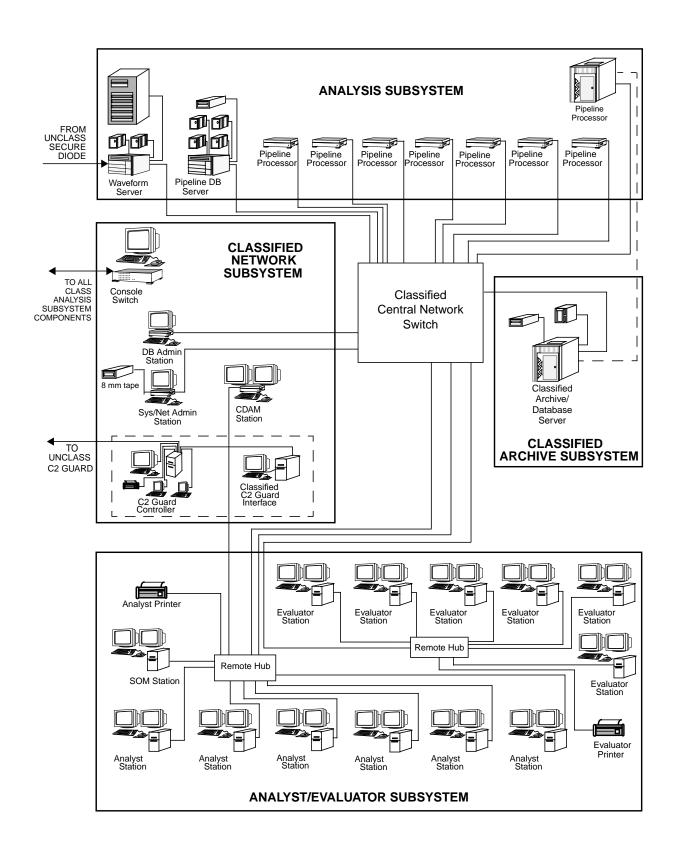
Figure 1-2. US NDC Classified System Connectivity

1-7.   UNCLASSIFIED SYSTEM.

1-8.   The Unclassified System consists of three subsystems which are further defined in the following paragraphs. The Unclassified System provides:

       a.   Control and monitoring of unclassified data input to the system.

       b.   Storage and archiving of unclassified data.

       c.   Control of data transfer to the Classified System.

1-9.   UNCLASSIFIED DATA ACQUISITION SUBSYSTEM. Controls the acquisition of unclassified data from the external sources including the IDC, and controls the forwarding of that data to the Classified Analysis Subsystem, the IDC, and other sites.

1-10.   UNCLASSIFIED ARCHIVE SUBSYSTEM. Provides long-term storage (180 days) of data received by the Data Acquisition Subsystem (DAS).

1-11.   UNCLASSIFIED NETWORK SUBSYSTEM. Incorporates the workstations for performing unclassified system and database administration, and includes the secure e-mail communication from the Classified System to the Unclassified System through the Unclassified Command and Control (C2) Guard. The Unclassified Network Subsystem includes the DNS/Mail Server which provides domain name services (DNS) and e-mail services.

1-12.   CLASSIFIED SYSTEM.

1-13.   The Classified System consists of four subsystems which are further defined in the following paragraphs. The Classified System provides:

       a.   Control and monitoring of data forwarded from the Unclassified System.

       b.   Data processing for analysis and evaluation.

       c.   Storage and archiving of data.

1-14.   ANALYSIS SUBSYSTEM. Processes raw data received from the Unclassified DAS for signal detection, feature extraction, automatic event building, and preparation of the data for use in the analysis process.

1-15.   CLASSIFIED ARCHIVE SUBSYSTEM. Stores and archives raw and processed data.

1-16.   ANALYST/EVALUATOR SUBSYSTEM. Provides users with the capability to review and refine currently-available results from automatic processing or interactive analysis.

1-17.   CLASSIFIED NETWORK SUBSYSTEM. Includes the workstations necessary for performing classified subsystem administrative functions and the secure communication interface to the Unclassified System through the Classified C2 Guard.

1-18.   EQUIPMENT SUPPLIED.

1-19.   Table 1-1 lists the equipment supplied for the US NDC system.

1-20.   EQUIPMENT REQUIRED BUT NOT SUPPLIED.

1-21.   Table 1-2 lists the equipment required to operate and maintain the US NDC system, but not supplied.

1-22.   LEADING PARTICULARS.

1-23.   Table 1-3 lists the logistical characteristics and environmental requirements for the US NDC system. For particulars on individual equipment, refer to the appropriate identifying technical instruction (ITI).

1-24.   CAPABILITIES AND LIMITATIONS.

1-25.   Table 1-4 lists the capabilities and limitations of the US NDC equipment.

1-26.   RELATED PUBLICATIONS.

1-27.   Table 1-5 lists the publications referenced throughout this technical instruction (TI) which provide additional information on the US NDC equipment, as well as information on related equipment.

Table 1-1. Equipment Supplied

ITEM	DESCRIPTION	QTY	APPLICATION
1	HARDWARE		
1a	SPARC Ultra 1 Creator P/N A12-UBA1-1E-128AB	2	Unclassified and Classified DAM Station with graphical capabilities.
1b	SPARC Ultra 1 Creator 3D P/N A12-UBA-9E-128AB	7	Pipeline Processors with superior graphical capabilities.
1c	SPARC Ultra 5 Creator P/N A21-UFE1A9J-128AG	3	Unclassified Sys/Net/DB Admin Station, Classified DB Admin Station, and Classified Sys/Net Admin Station.
1d	Ultra Enterprise 450 P/N E450	4	Classified and Unclassified Archive/Database Servers, Diskloop Server, and one Pipeline Processor.
1e	Ultra 10 Workstation P/N Ultra 10	13	SOM and Analyst/Evaluator Workstations.
1f	SPARCstation 10 P/N SS10	1	DNS/Mail Server.
1g	E4000 Server Base Unit P/N 600-4583-02	2	Waveform Server and Pipeline Database Server.
1h	StorEdge A3500 P/N SG-ARY391A-364G	1	Data storage for Classified Waveform Server.
1i	External Tape Drive 35-70-DLT 7000 P/N X6060A	2	Provides additional seismic data storage and system backups for Pipeline DB Server and Archive/ Database Server, and enables loading of application software.
1j	SPARCstorage Multipack P/N 595-4280-02	6	External SCSI disk storage for the Waveform Server, Pipeline DB Server, and DNS/Mail Server.
1k	SPARCstorage Multipack2 P/N 595-4451	2	External SCSI disk storage for the Pipeline Database Server.
1l	External 8 mm Tape Drive P/N 595-4846-01	2	Provides additional data storage for Unclassified Sys/Net/DB Admin and Classified Sys/Net Admin Stations.

Table 1-1. Equipment Supplied (Cont)

ITEM	DESCRIPTION	QTY	APPLICATION
1m	StorEdge L3500 P/N 595-4445	1	Data storage for Unclassified Archive Tape Library.
1n	StorEdge L280 P/N L280	1	Data storage for Classified Archive/ Database Server.
1o	20 in Color Monitor P/N 365-1335	3	Provide visual display of system screens and reports.
1p	21 in Color Monitor P/N 365-1383	31	Provide visual display of system screens and reports.
1q	BW Laser Printer, Lexmark P/N OPTRA S 1625	2	Provide print capability for analysts and evaluators.
1r	Console Switch, 12-port P/N KV5012FA	2	Allows monitoring of headless unclassified and classified processors.
1s	16 in Color Monitor P/N 365-1020	2	Connected to Console Switches to provide visual display for headless processors.
2	SOFTWARE		
2a	Solaris Version 2.6 P/N 411-1630-01	Each SUN Machine	Operating system software for each station.
2b	ISIS Version 3.3.1 P/N D007, Rev. 00A	1	COTS software for message distribution and interprocess communication.
2c	SAM-FS Version 3.3.1-36	2	COTS software for data archiving.
2d	Oracle Server Version 7.3.4.5	1 Site License	COTS software for database management and administration.
2e	ArcView Version 3.2 P/N 84319	1	COTS software to interface with Geographic Information System data; provides an interface to the Knowledge Base geographic data.
2f	ArcView Spatial Analysis Version 3.2.31 P/N 75029	1	COTS software for spatial orientation of each image within ArcView.

Table 1-1. Equipment Supplied (Cont)

ITEM	DESCRIPTION	QTY	APPLICATION
2g	FrameMaker Version 5.5.3 P/N 37900226	4	COTS software providing desktop publishing.
2h	Splus Version 5.1	1	COTS software for producing graphics for Perf Mon.
2i	ghostscript Version 2.6.2 Internet download	1	Open Source software for processing PostScript images.
2j	GNU GZIP Version 1.2.4 Internet download	1	Open Source software providing a suite of tools to compress Oracle database.
2k	PERL Version 5.004 Internet download	1	Open Source software for script development.

Table 1-2. Equipment Required but not Supplied

ITEM	DESCRIPTION	QTY	ESSENTIAL CHARACTERISTICS
1	Standard ESD Equipment	1	Used to support ESD precautions for maintenance actions.
2	Cable Repair Kit	1	Suitable for RS-232 cable, twisted pair.
3	RS-232 Breakout Test Tool	1	Used to verify the presence of signals at RS-232 connections.
4	ASCII Terminal (similar to WY-60)	1	Used to view diagnostic data for system machines.
5	DRAM Insertion Tool	1	Used for insertion of DSIMMs in memory slots on SPARCstation 10.
6	DSIMM Extraction Tool	1	Used to extract DSIMMs from memory slots on SPARCstation 10.
7	Calibrated Torque Screwdriver (6 ft-lbs)	1	Used for installation of CPU modules.

Table 1-2. Equipment Required but not Supplied (Cont)

ITEM	DESCRIPTION	QTY	ESSENTIAL CHARACTERISTICS
8	Multimeter, Fluke 75/77 (or equivalent)	1	Portable digital/analog multimeter. Function Range/Accuracy dc V 0.1 mV - 1000 V/0.3% ac V 1 mV - 750 V/2.0% ohms 0.1 ohms - 32 M ohms/0.5% dc A .01 mA - 10 A/0.3% ac A .01 mA - 10 A/0.3%

9	Oscilloscope, Tektronix 222 (or equivalent)	1	Portable, dual vertical channel, digital storage oscilloscope.
			
			Function Range/Sensitivity
			Operating time: Minimum 2 hours with full charge
			Charge time: 3 hours
			Frequency: dc to 10 MHz
			Digitizing rate: 10 samples/sec
			Bandwidth: (repetitive) 10 MHz
			   (non-repetitive) 1 MHz
			Sensitivity: (vertical) 5 mV to 50 V/div
			   (horizontal) 50 ns to 20 sec/div

10	RS-232 Cable	2	DB25 to DB25 connectors.
11	Null-modem adapter	2	DB25 to DB9 connectors.
12	Gender Mender	2	DB25M to DB25M connectors.
13	Gender Mender	2	DB25F to DB25F connectors.
14	Extraction Tool	1	For removal of DIP/ICs.
15	Allen Wrench	1	Standard tool.
16	Screwdriver, Slotted 3/16"	1	Standard tool.
17	Screwdriver, Phillips #0	1	Standard tool.
18	Screwdriver, Phillips #1	1	Standard tool.

Table 1-2. Equipment Required but not Supplied (Cont)

ITEM	DESCRIPTION	QTY	ESSENTIAL CHARACTERISTICS
19	Screwdriver, Phillips #2	1	Standard tool.
20	Hex Driver, M-4	1	Standard tool.
21	Hex Driver, 3/16 in or 5mm	1	Standard tool.
22	Hex Driver, 3/8 in	1	Standard tool.
23	Wrist Strap	1	Electrostatic grounding.
24	Wrench, 13 mm	1	Standard tool.
25	Wrench, 32 mm	1	Standard tool.
26	Wrench, 8 in, adjustable	1	Standard tool.
27	Needle-nose Pliers	1	Standard tool.
28	Flashlight	1	Standard item.

Table 1-3. Leading Particulars

ITEM	DESCRIPTION	CHARACTERISTICS
1	**PHYSICAL CHARACTERISTICS**	
	Weight	5973 lbs
2	**POWER REQUIREMENTS***	
	Voltage	115/230 Vac, 60 Hz
	Current	308.7 A
	Power	26.2 kW
3	**ENVIRONMENTAL CHARACTERISTICS**	
	Temperature (operating) (storage)	50° to 95° F 32° to 122° F

Table 1-3. Leading Particulars (Cont)

ITEM	DESCRIPTION		CHARACTERISTICS
	Relative Humidity (all equipment except Ultra 5 and Ultra 10)	(operating) (storage)	20 to 80% relative (non-condensing) 15 to 95% relative
	Relative Humidity (Ultra 5 and Ultra 10 ONLY)	(operating) (storage)	40 to 80% relative (non-condensing) 30 to 90% relative
	Altitude	(operating) (storage)	0 - 7,000 ft. 0 - 39,700 ft.

*Estimate based on manufacturer-furnished data and engineering estimates for components of the system. Current and power estimates assume that all equipment is operating at surge.

Table 1-4. Capabilities and Limitations

DESCRIPTION	CHARACTERISTICS

Seismic data acquisition	ADSN Data Inputs:
	
	  SP = 154
	  LP = 129
	  BB = 30
	
	ASN Data Inputs:
	
	  SP = 8
	  LP = 24
	  BB = 24
	
	UCSD Data Inputs:
	
	  BB = 6
	
	USGS Data Inputs (alphanumeric):
	
	  BB = 9
	
	IDC Data Inputs:
	
	  SP = 109
	  LP = 21
	  BB = 34
	  MP = 7
	  EP = 4

Table 1-4. Capabilities and Limitations (Cont)

DESCRIPTION	CHARACTERISTICS

Seismic data acquisition (cont)	SMU Data Inputs:
	
	  SP = 29
	  LP = 3
	  BB =15
	
	CMR Data Inputs:
	
	  SP = 25
	  LP = 6
	  BB = 8
	  MP = 5
	
	PDAR (Pinedale, Wyoming)
	
	  SP = 16
	  BB = 3
	
	06X
	
	  SP = 31
	  LP = 9
	
	NORSAR
	
	  SP = 40
	  LP = 3
	  BB = 18

Hydroacoustic data acquisition*	Classified Data Inputs:
	
	  EP = 18
	
	Unclassified Data Inputs:
	
	  EP = 12

Infrasonic data acquisition	SP = 15 MP = 7
Data pre-processing	Pre-processing minimizes errors caused by spikes, dropouts and glitches, and allows the user to adjust the error rate threshold. The user is notified if the error rate exceeds the threshold.

Table 1-4. Capabilities and Limitations (Cont)

DESCRIPTION	CHARACTERISTICS
Signal Detection	Performs automatic signal detection and each detection record includes a station identifier, channel or beam information, arrival time, azimuth, maximum peak-to-peak signal amplitude, slowness, fk quality, dominant period, and signal type. A parallel process selects arrival phases from the incoming hydroacoustic data stream.
	US NDC pre-processes unprocessed data prior to signal detection. Pre-processed data includes pre-filtering data prior to beamforming; configuration of beam parameters, recipe files, and filters; and permits conditioning of the waveform to include removal of system transfer function.
	The US NDC forms radial and transverse beams for three-component data. The US NDC automatically forms beams from array data and runs detection algorithms over seismic and hydroacoustic waveform data.
Event formation automatic processes	Performs the following automatic processes: phase identification, detection association, geo-location of events; and calculates raw, maximum likelihood, and corrected event magnitudes, when an event is created or changed.

Table 1-4. Capabilities and Limitations (Cont)

DESCRIPTION	CHARACTERISTICS
Interactive data review	Provides interactive tools for review and analysis of seismic data. Interactive windows allow the user to review status, input, and output handling of automatic functions. Provides interactive graphics and display functions for waveforms, beams, maps, fk and spectra. Allows editing phase identification of a detection. An interactive editor permits the association and disassociation of detections to an event, and edits detections or creates new detections. An automatic prediction routine with user-definable parameters predicts arrival times of phases associated with a given event not detected by the automatic signal detection algorithms. Allows manual creation and editing of any event record. Interactive editor allows modification of event locations. Allows manual exclusion of associated detection when determining event location. Provides interactive tool for magnitude calculations. Classifies each event formed as an earthquake or explosion.
Reporting (upon user request)	Generates alert, special, and final event reports. Generates an event bulletin for a given time frame. The US NDC has the capability to process 30,000 events per year within 1-24 hours of occurrence.
Data compression	Compresses waveform data stored on off-line media.
Power and conditioning	Capable of operating on local generator power in the event of an UPS failure.
System capacity	Under normal loading, the US NDC processes up to 100 seismic events per 24 hour work day and at least one event per day for hydroacoustic-only events. Under swarm loading, the US NDC processes up to 400 seismic events per day without disruption or shutdown of the processing system.

Table 1-4. Capabilities and Limitations (Cont)

DESCRIPTION	CHARACTERISTICS
Waveform processing system modes	The US NDC processes data in Global Processing Mode (GPM), Look-Forward, Look-Back/Recall and Spotlight modes of operation. The GPM is the core of the operational system. It covers processing of all waveform data from data acquisition to reporting. Under Look-Forward mode processing, the US NDC is capable of processing one selected area at any given time. Selected unprocessed data is available to the analyst within 60 seconds of arrival at the Classified DAS, and Look-Forward results are available for initial reporting purposes within 10 minutes of data being available. The US NDC allows limited duration tip-off processing of selected IMS stations. Under the Look-Back/Recall mode, the US NDC capability allows additional processing on one limited geographical area and time interval, in order to perform more thorough processing than previously obtained, whenever outside information indicates a possible nuclear explosion has occurred. Separate database accounts and disk space are provided for a maximum of six two-week data sets of GPM station network. Look-Back processing results are available immediately to the analyst. Under the Spotlight mode, the US NDC provides continuous routine monitoring of two high-concern areas at lower thresholds than standard network processing. The US NDC Spotlight processing can be customized to meet varying requirements of each region.

Table 1-4. Capabilities and Limitations (Cont)

DESCRIPTION	CHARACTERISTICS
Late arriving data	The US NDC notifies the SOM of late arriving data. Data is sent through automatic processing and incorporated into regularly scheduled products so as to be available to analyst within five minutes of receipt by the Classified System.
Derived date waveform beam availability	The US NDC provides beam parameters on-line for a minimum of 30 days.
Event location	The US NDC computes an origin using available seismic waveform data and defines location by latitude, longitude, depth (elevation), origin time, and earth model. Three solutions are computed for any selected seismic event location (e.g., depth unconstrained, depth fixed at the Earth's surface, and depth restrained to a user-specified value).
Interactive analysis capability	The US NDC interactive analysis provides the capability for a user to review, refine, correct, and/or display the currently available results generated from automated processing systems or from previous analysis by another user.
Data storage and access	The US NDC stores all unprocessed waveform data received by class. Classes are based on the age of data; data classes may overlap
(1) UDAS storage classes	• Short-term: all data less than 7 days old is accessible in 5 seconds. • Intermediate: data between 7 and 10 days old is accessible in 30 minutes. • Long-term DLT archive library: data between 10 and 180 days old is accessible within 60 minutes. All unprocessed waveform data will be archived for a minimum of 180 days.

Table 1-4. Capabilities and Limitations (Cont)

DESCRIPTION	CHARACTERISTICS
(2) CDAS storage classes and archives	• Short-term: all data less than 45 days old is accessible in 5 seconds. • Long-term alphanumeric data: all data greater than 45 days is accessible in 24 hours.
Data Management Services (DMS)	Data removed from on-line storage can be restored within 24 hours.
Identification and Authentication	The US NDC provides user ID password controls. Individual accountability is enforced by providing capability to uniquely identify each user. Password files are protected from unauthorized users.

*Maximum capability is dependent upon available storage of data acquisition system.

Table 1-5. Related Publications

PUBLICATION NUMBER	PUBLICATION NAME
2SE-SWITCH/KV5200-1	ServSwitch Ultra Installation and Operation Manual (KV5200 Series)
2WS-8MMTD/DSM-1	Installation and User's Manual, 14 GByte, 8mm Tape Desktop Storage Pack (802-1638-10, Rev. A)
2WS-DA/D1000-8	Sun StorEdge D1000 Storage Guide (805-4013-10)
2WS-DA/X1000-1	Sun StorEdge A1000 and D1000 Installation, Operations, and Service Manual (805-2624-10)
2WS-DA/X1000-11	Sun StorEdge RAID Manager 6.22 A1000 and D1000 Product Note (805-4866-10)
2WS-DLT/L280-1	Sun StorEdge L280 User's Guide (805-3957-11)
2WS-DLT/L3500-1	Sun StorEdge L3500 Operator's Guide (805-1035-11)
2WS-PRNTR/NA-7	Lexmark Printer Network Adapter Hardware Setup (16A0120)
2WS-PRNTR/OPTRAS-1	Lexmark Printer Optra S User's Guide (43H5318)
2WS-RAID/6.22-1	Sun StorEdge RAID Manager 6.22 User's Guide (806-0478-10)

Table 1-5. Related Publications (Cont)

PUBLICATION NUMBER	PUBLICATION NAME
2WS-RAID/6.22-11	Sun StorEdge RAID Manager 6.22 Release Notes (805-7758-11)
2WS-RAID/6.22-7	Sun StorEdge RAID Manager 6.22 Installation and Support Guide for Solaris (805-7756-10)
2WS-RAID/A3500-1	Sun StorEdge A3500/A3500FC Hardware Configuration Guide (805-4981-13)
2WS-RAID/A3500/CM-1	Sun StorEdge A3500/A3500FC Controller Module Guide (805-4980-11)
2WS-SAM-FS-8	SAM-FS System Administrator's Guide
2WS-SPARC/DLT7000-1	Sun 35-70 GByte SPARCstorage DLT 7000 Manual (805-0648-10)
2WS-SPARC/MP-1	Sun SPARCstorage MultiPack User's Guide (802-4428)
2WS-SPARC/MP-7	Sun SPARCstorage MultiPack Installation (802-4429)
2WS-SPARC/MP2-2	Sun SPARCstorage MultiPack 2 Service Manual (805-1667)
2WS-SPARC10-1	Sun SPARCstation 10 Service Manual (800-6358)
2WS-SUN/CM/17/20-1	17-inch/20-inch Premium Color Monitor Guide
2WS-SUN/CM/21-1	21-inch Premium Color Monitor Guide
2WS-SUN/KB5-11	Sun Type 5c Keyboard and Mouse Product Notes
2WS-ULTRA/E4000-1	Sun Ultra Enterprise 6000/5000/4000 Systems Manual (802-3845)
2WS-ULTRA/E450-1	Ultra Enterprise 450 Server Owner's Guide (805-0429-10, Rev. A)
2WS-ULTRA1-2	Sun Ultra 1 Creator Series Service Manual (802-4148)
2WS-ULTRA5/10-2	Sun Ultra 5/10 Service Manual (805-0423)

CHAPTER 2

INSTALLATION

2-1.   INTRODUCTION.

2-2.   Chapter 2 provides startup procedures for the United States National Data Center (US NDC). The US NDC is composed of standard commercial off-the-shelf (COTS) equipment and software, and specialized applications software. It is assumed all hardware and software has been connected and/or installed; therefore, only procedures for bringing the system to the login prompt in the proper sequence are provided. If the system or any components fail to boot properly, refer to chapter 5 for troubleshooting procedures. For additional information on COTS equipment and software, refer to the applicable identifying technical instruction (ITI).

2-3.   The US NDC is considered a permanent installation and all systems and components are already properly connected. Therefore, instructions are not provided for tear-down, relocation and re-installation. The floor plan, rack layout diagrams, and cabling diagrams are provided in chapter 7.

2-4.   Each workstation and server in the system is assigned a functional name as well as a machine name (e.g., Classified DAM Workstation is a functional name and cdam is the corresponding machine name). References to either name is found throughout this manual. A cross-reference list of workstation and server functional names and their corresponding machine names is provided in appendix 1.

2-5.   STARTUP SEQUENCE.

2-6.   Prior to powering on the equipment, verify circuit breakers and power center extensions are ON and peripherals are OFF. Verify the Unclassified and Classified Central Network Switches (cat5000) and both Remote Hubs (ndchub1 and ndchub2) on the Classified System are powered ON. In some instances, certain equipment must be running prior to powering ON other dependent equipment; therefore, each machine must be started in the order listed in the following procedures. Refer to applicable ITIs for settings of controls and indicators.

2-7.   Once each machine is powered ON, refer to chapter 3 of TI 2-NDC-1 for software and process startup procedures. Chapter 3 of TI 2-NDC-1 is divided into three sections according to functional areas: Data Acquisition Manager (DAM), System Operations Manager (SOM), and Analyst/Evaluator. Each section contains complete operating instructions, including startup procedures, for the functional area.

2-8.   UNCLASSIFIED SYSTEM HARDWARE POWER ON PROCEDURES.

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┌─────────────────┐
│   **CAUTION**   │
└─────────────────┘

</div>

The following procedures are order-specific. Each machine must be started up in the order in which it appears in the following paragraphs

2-9.   UNCLASSIFIED CONSOLE SWITCH.

    a.   Turn ON monitor power switch for the Unclassified Console Switch.

    b.   Turn ON power switch on the rear panel of the Unclassified Console Switch.

2-10.   DNS/MAIL SERVER (ndcadmin).

    a.   Turn ON power switches for both MultiPack peripheral disk drives.

    b.   Turn ON SPARCstation 10 power switch.

2-11.   DISKLOOP SERVER (dlsa).

    a.   Open top door on front of Ultra Enterprise 450 (dlsa) and ensure keyswitch is in standby position (⏻).

    b.   Press rear panel ac power switch to ON (|) position.

    c.   Turn keyswitch to the power ON (|) position.

    d.   Verify the green power ON light emitting diode (LED) remains on, then turn front panel keyswitch clockwise to locked (🔒) position.

2-12.   UNCLASSIFIED ARCHIVE/DATABASE SERVER (uarch).

    a.   Press rear panel ac power switch to ON (|) position on the L3500.

    b.   Press the StorEdge L3500 Tape Library front control panel standby (⏻) button and verify the display shows System Online.

    c.   Open top door on front of Ultra Enterprise 450 (uarch) and ensure keyswitch is in standby position (⏻).

d.   Press rear panel ac power switch to ON (|) position.

e.   Turn keyswitch to the power ON (|) position.

f.   Verify the green power ON LED remains on, then turn front panel keyswitch clockwise to locked (🔒) position.

2-13.   Verify headless machines have booted using the following procedure.

a.   From Unclassified Console Switch monitor, press and release the keyboard left **<Control>** key, then type **s**. Do NOT press return. The Console Switch will cycle through each of the headless machines (i.e., dlsa, uarch, ndcadmin).

b.   Ensure all headless processors are at the login screen.

2-14.   UNCLASSIFIED DAM STATION (udam).

a.   Turn ON monitor power switches for both monitors.

b.   Turn ON Ultra 1 Creator processor (udam) power switch and verify the login screen appears.

2-15.   SYS/NET/DB ADMIN STATION (usysadmin).

a.   Turn ON external 8mm tape drive.

b.   Turn ON monitor power switch.

c.   Turn ON Ultra 5 processor (usysadmin) power switch and verify the login screen appears.

2-16.   UNCLASSIFIED C2 GUARD INTERFACE (lqmgr).

a.   Turn ON Unclassified Command and Control (C2) Guard Interface monitor power switch.

b.   Turn ON Ultra 10 processor (lqmgr) power switch and verify the login screen appears.

The NDC can run normally for several days without time being synchronized.

2-17.   Verify NTP has been initialized using the following procedure.

    a.   Logon to ndcadmin.

    b.   Type:

```
ntpq -p
```

```
     remote      refid    st t   when poll reach delay offsetdis
==================================================================
LOCAL (0)    LOCAL       3  l   28   64   377   0.00   0.000  10.01
*scinter.aftac.g ntp0.usno.navy.  2  u  212  256  377   5.13  -0.297   0.66
```

    c.   Verify that scinter.aftac.g appears on the second line of the output.

2-18.   UNCLASSIFIED SYSTEM SOFTWARE STARTUP PROCEDURES.

2-19.   Once the hardware power on procedures are complete, refer to TI 2-NDC-1 for the appropriate software and process startup procedures.

CAUTION

The following procedures are order-specific. Each machine must be started up in the order in which it appears in the following paragraphs.

2-20.   CLASSIFIED SYSTEM HARDWARE POWER ON PROCEDURES.

2-21.   CLASSIFIED CONSOLE SWITCH.

    a.   Turn ON monitor power switch for the Classified Console Switch.

    b.   Turn ON power switch on the rear panel of the Classified Console Switch.

2-22.   WAVEFORM SERVER (wfsa).

    a.   To power ON the A3500 perform the following:

        (1)   Open rear door of rack.

        (2)   Turn ON main power breaker on power sequencer (bottom rear box).

(3)   Close rear door.

Due to wires connected to the key switch use care when removing panel.

(4)   Loosen four captive screws on lowest front panel.

(5)   Set panels aside and turn ON main power breaker on power sequencer (bottom front box).

(6)   Replace panel and secure screws.

b.   Turn ON power switches on both MultiPack 2 storage units.

- - NOTE - -

Wait approximately three minutes for disks to spin up to speed before proceeding to next step.

c.   On the Ultra Enterprise 4000 server (wfsa), perform the following:

(1)   Set the front panel key switch to standby (⏻) position.

(2)   Turn ON ac power switch on rear panel.

(3)   Set front panel key switch to ON (│) position.

(4)   Verify the front panel top LED status indicator lights green.

(5)   Verify the front panel middle LED flashes yellow during POST, then goes OFF.

(6)   Verify the front panel bottom LED begins flashing green after 60 seconds to indicate the system is running.

(7)   Verify the login screen is up and ready on the Console Switch Monitor.

(8)   Move keyswitch to locked position.

2-23.   CLASSIFIED DAM STATION (cdam).

   a.   Turn ON monitor power switches for both monitors.

   b.   Turn ON Ultra 1 Creator processor (cdam) power switch.

   c.   Verify login screen appears.

2-24.   PIPELINE DB SERVER (cdbsa).

   a.   Turn ON DLT 7000 tape drive power switch.

   b.   Turn ON power switches for all four MultiPack storage units.

   c.   On the Ultra Enterprise 4000 server (cdbsa), perform the following:

      (1)   Set the front panel key switch to standby (⏻) position.

      (2)   Turn ON ac power switch on rear panel.

      (3)   Set front panel key switch to ON (|) position.

      (4)   Verify the front panel top LED status indicator lights green.

      (5)   Verify the front panel middle LED flashes yellow during POST, then goes OFF.

      (6)   Verify the front panel bottom LED begins flashing green after 60 seconds to indicate the system is running.

      (7)   Verify the login screen is up and ready on the Console Switch Monitor.

      (8)   Move keyswitch to locked position.

2-25.   PIPELINE PROCESSORS (pipe1 - pipe7a).

- - NOTE - -

Allow approximately five minutes for the Ultra Enterprise 4000 to power up before proceeding to the next step.

2-26.   Turn ON power switch (not order-specific) for each Ultra 1 Creator Pipeline Processor (pipe1a - pipe7a).

2-27.   PIPELINE PROCESSOR (pipe8a).

a.   Open top door on front of Ultra Enterprise 450 (pipe8a) and ensure keyswitch is in standby position (⏻).

b.   Press rear panel ac power switch to ON (|) position.

c.   Turn keyswitch to the power ON (|) position.

d.   Verify the green power ON LED remains on, then turn front panel keyswitch clockwise to locked (🔒) position.

2-28.   SYS/NET ADMIN STATION (sysadmin).

a.   Turn ON external 8mm tape drive.

b.   Turn ON monitor power switch.

c.   Turn ON Ultra 5 processor (sysadmin) power switch and verify login screen appears.

2-29.   DB ADMIN STATION (dbadmin).

a.   Turn ON monitor power switch.

b.   Turn ON Ultra 5 processor (dbadmin) power switch and verify login screen appears.

2-30.   SOM STATION (som1).

a.   Turn ON monitor power switches for both monitors.

b.   Turn ON Ultra 1 processor (som1) power switch and verify login screen appears.

2-31.   CLASSIFIED ARCHIVE/DATABASE SERVER (carch).

- - NOTE - -

Initially the messages NOT READY/SELF TEST, NOT READY/INVENTORY CHECK, *and* NOT READY/CHECK DRIVE *will alternately be displayed on the StorEdge L280 front panel. After approximately 30 seconds, the drive status information will be displayed.*

a.   Open door of StorEdge L280 and turn power switch ON.

b.   Turn ON DLT tape drive power switch.

c.   Open top door on front of Ultra Enterprise 450 (carch) and ensure keyswitch is in standby (⏻) position.

d.   Press rear panel ac power switch to ON (|) position.

e.   Turn keyswitch to the power ON (|) position.

f.   Verify the green power on LED remains ON, then turn front panel keyswitch clockwise to locked (🔒) position.

2-32.   ANALYST STATIONS (analyst1 - analyst6).

a.   Turn ON analyst workstation printer (aoc-lp) power switch.

b.   Turn ON monitor power switches for both monitors on analyst1 workstation.

c.   Turn ON analyst1 Ultra 10 processor (analyst1) power switch and verify login screen appears.

d.   Repeat steps b. and c. for analyst2 - analyst6 workstations.

2-33.   EVALUATOR STATIONS (eval1 - eval6).

a.   Turn ON evaluator workstation printer (eval-lp) power switch.

b.   Turn ON monitor power switches for both monitors on eval1 workstation.

c.   Turn ON Ultra 10 processor (eval1) power switch and verify login screen appears.

d.   Repeat steps b. and c. for eval2 - eval6 workstations.

2-34.   CLASSIFIED C2 GUARD INTERFACE (hqmgr).

a.   Turn ON Classified C2 Guard Interface monitor power switch.

b.   Turn ON Ultra 10 processor (hqmgr) power switch and verify the login screen appears.

2-35.   CLASSIFIED C2 GUARD STATION (XTS-300).

a.   Turn ON Classified C2 Guard WorkStation (XTS-300) 15-in. monitor power switch.

b.   Turn ON both XTS-300 ASCII terminal monitor power switches.

c.   Turn ON XTS-300 laser printer power switch.

d.   Turn ON both power switches (A and B) on the XTS-300 processor.

e.   From XTS-300 console, at the `Enter Password (1):` prompt, enter admin password.

f.   When STOP OS finishes booting and System Ready message followed by day of week, date and time appears on XTS-300 monitor, press **<Alt Print Scrn>** to display prompt.

g.   At `Enter user name` prompt, login as operator by typing:

`?`**`operator`**↵

h.   At `Enter password` prompt, enter operator password. The following display will appear:

```
Login complete on console at <current date and time>
Last login was on console at <last login date and time>

Initial level is sec lvl 15(C2G_admin, C2G_Status, REF1, sc3, sc4,
sc5, sc6, sc7, sc8, sc9, sc10, sc11, sc12, sc13, sc14, sc15, sc16,
sc16, sc17, sc18, sc19, sc20, sc21, sc22, sc23, sc24, sc25, sc26,
sc27, sc28, sc29, sc30, sc31, sc32, sc33, sc34, sc35, sc36, sc37,
sc38, sc39, sc40, sc41, sc42, sc43, sc44, sc45, sc46, sc47, sc48,
sc49, sc50, sc51, sc52, sc53, sc54, sc55, sc56, sc57, sc58, sc50,
sc60, sc61, sc62, sc63) Operator
```

i.   Press **<Alt><Print Scrn>** to display prompt.

j. At the `Enter command` prompt, start up XTS-300 processing by typing:

```
?startup↵
Startup complete
```

k. Press **<Alt><Print Scrn>** to display prompt.

l. At the `Enter command` prompt, enter the C2G environment by typing:

```
?c2g↵
C2G is NOT running
Queue: State Host  QSND  FGET  IVM    ENF  OVM   FPUT  QRVC  Host
    q1 Halt  high  Stop  Stop  Stop  Stop Stop  Stop  Stop  low
    q2 Halt  high  Stop  Stop  Stop  Stop Stop  Stop  Stop  low
```

m. At the `Enter Guard request` prompt, start the c2g process by typing:

```
?start↵
starting the Guard...
C2G started.
Start OK.
```

n. Login to Classified C2 Guard Interface (hqmgr) as root or lgmaint.

o. To determine if qmainv process is running, type:

```
tail /usr/qmgr/sqmrd/.log↵
```

p. The message `q_main: qmainv processing started` should appear in the output.

q. Logout of hqmgr.

r. Perform steps o. through q. on Unclassified C2 Guard Interface (lqmgr).

s. At the `Enter Guard request` prompt on the XTS-300 console, start queue1 by typing:

```
?start q1↵
q1 loaded
q1 started
queue q1 started
```

t.   At the `Enter Guard request` prompt, check the status of the c2g process by typing:

```
?status↵
C2G is running
Queue: State Host  QSND  FGET  IVM   ENF   OVM   FPUT  QRVC  Host
    q1 Run   high  Run   Run   Run   Run   Run   Run   Run   low
    q2 Halt  high  Stop  Stop  Stop  Stop  Stop  Stop  Stop  low
```

u.   At the `Enter Guard request` prompt, exit the C2G environment by typing:

```
?exit↵
```

v.   Press **<Alt><Print Scrn>** to display prompt.

w.   At `Enter Command` prompt, log off by typing:

```
?logout↵
Logout complete
```

- - NOTE - -

The NDC can run normally for several days without time being synchronized.

2-36.   Verify NTP has been initialized using the following procedure:

a.   Logon to wfsa.

b.   Type:

```
ntpq -p
```

remote	refid	st	t	when	poll	reach	delay	offset	dis
LOCAL (0)	LOCAL	3	l	28	64	377	0.00	0.000	10.01
*bagheera.aftac.		2	u	212	256	377	5.13	-0.297	0.66

c.   Verify that bagheera.aftac. appears on the second line of the output.

2-37.   CLASSIFIED SYSTEM STARTUP PROCEDURES.

2-38.   Once all hardware power on procedures are complete, refer to TI 2-NDC-1 for the appropriate software and process startup procedures.

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CHAPTER 3

OPERATION

3-1. INTRODUCTION.

3-2. Chapter 3 provides routine procedures for system shutdown, partial shutdown of individual elements in support of maintenance, and emergency shutdown of the United States National Data Center (US NDC).

3-3. Section I refers to Technical Instruction (TI) 2-NDC-1 for software controls and indicators. Separate manuals for identification of hardware controls and indicators are referenced where appropriate.

3-4. Section II provides operating instructions for shutdown of the entire system and shutdown/restart of individual components. Operating procedures beyond those necessary to perform hardware maintenance are described in TI 2-NDC-1.

3-5. Section III provides emergency shutdown procedures.

SECTION I

CONTROLS AND INDICATORS

3-6. GENERAL.

3-7. Software controls and indicators for the system are referred to throughout TI 2-NDC-1, as applicable. Hardware controls and indicators are covered in applicable commercial manuals. For applicable commercial manual, refer to table 1-5.

SECTION II

OPERATING INSTRUCTIONS

3-8. INTRODUCTION.

3-9. Operating procedures for the system are provided in TI 2-NDC-1. Section II provides routine and partial shutdown/power off procedures. Shutdown procedures are performed on system software. Power off procedures are performed on system hardware.

3-10.   Procedures for reactivating the system after partial shutdown are provided along with each specific shutdown procedure. Routine power on procedures are contained in chapter 2.

3-11.   ROUTINE SHUTDOWN PROCEDURES.

3-12.   The system is designed to operate continuously and should only be shut down/ powered off for maintenance and extended non-use periods (e.g., transfer of mission to alternate headquarters during a hurricane threat). The system is assumed to be operating normally prior to starting the following procedures.

3-13.   To initiate a routine shutdown/power off, coordinate with the Data Acquisition Manager (DAM) and the System Operations Manager (SOM) to ensure all users are logged off and all application processes are shut down in accordance with (IAW) TI 2-NDC-1.

CAUTION

DO NOT use Stop-a or L1-a keys to halt operating system or any other stand-alone program which is booted. Using Stop-a or L1-a keys to abort program execution can cause damage to data files. This approach should be used only when no other option exists to shut down the system.

- - NOTE - -

Classified and unclassified shutdown procedures may be performed simultaneously.

3-14.   UNCLASSIFIED SYSTEM OPERATING SYSTEM SHUTDOWN
          (ORDER-SPECIFIC).

          a.   From the Unclassified Console Switch monitor, press and release the keyboard left <**Control**> key, then type **1** using the number key at the top of the keyboard. DO NOT use the keypad numbers and DO NOT press return. Wait for the Console Switch to change ports.

          b.   Login to DNS/Mail Server (ndcadmin) as lgmaint.

          c.   Open an xterm window.

          d.   Remotely login (using rlogin, rsh, or telnet) to the Unclassified DAM Station (udam).

e. At the udam{lgmaint} prompt, type:

`# haltsys↵`

```
YOU HAVE REQUESTED TO SHUTDOWN: udam

Are you sure you want to continue?
 <yes / no>
```

`yes↵`

```
Connection Closed
```

f. Repeat the previous two steps for the Sys/Net/DB Admin Station (usysadmin).

g. From the xterm window, remotely login (using rlogin, rsh, or telnet) to the Unclassified Archive/DB Server (uarch).

h. At the uarch{lgmaint} prompt, type:

`haltsys↵`

```
YOU HAVE REQUESTED TO SHUT DOWN: uarch

Are you sure you want to continue?
<yes / no>
```

`yes↵`

```
**This machine is critical to network operation. If you really want
to shut this system down, type its name:
```

`uarch↵`

```
Connection Closed
```

i. To take the L3500 tape library offline, press the control panel standby button (⏻) and ensure that System Offline is displayed in the system state display of the control panel.

j. From the xterm window, remotely login (using rlogin, rsh, or telnet) to the Diskloop Server (dlsa).

k.	At the dlsa{lgmaint} prompt, type:

haltsys↵

YOU HAVE REQUESTED TO SHUTDOWN: dlsa

Are you sure you want to continue?
 <yes / no>

yes↵

**This machine is critical to network operation. If you really want
to shut this system down, type its name:

dlsa↵

Connection Closed

l.	From the Unclassified Console Switch Monitor, press and release the keyboard left <**Control**> key, then type **s**. DO NOT press return. The Console Switch will cycle through each of the headless machines (ie., dlsa, uarch and ndcadmin)

m.	Ensure all headless processors are at the boot prompt with the exception of ndcadmin.

```
    CAUTION
```

*To prevent file system damage, ensure all processors are a boot prompt
before shutting down DNS/Mail Server.*

n.	After all headless machines are at the boot prompt, press and release keyboard left <**Control**> key then type **1**.

o.	From the ndcadmin{lgmaint} prompt, type:

haltsys↵

YOU HAVE REQUESTED TO SHUTDOWN: ndcadmin

Are you sure you want to continue?
 <yes / no>

yes↵

```
**This machine is critical to network operation. If you really want
to shut this system down, type its name:
```

ndcadmin↵

```
Connection Closed
```

3-15.   UNCLASSIFIED SYSTEM HARDWARE POWER OFF (NOT ORDER-SPECIFIC).

<div style="text-align:center">

┌─────────────────┐
│   **CAUTION**   │
└─────────────────┘

</div>

*Ensure each station monitor is displaying a boot prompt prior to
powering OFF, or damage to system files may occur.*

    a.   Power OFF computer first, then all associated peripherals for each of the
following stations:

        (1)   Unclassified Archive/DB Server (uarch)

        (2)   Diskloop Server (dlsa)

        (3)   DNS/Mail Server (ndcadmin)

        (4)   Sys/Net/DB Admin Station (usysadmin)

        (5)   Unclassified DAM Station (udam)

    b.   Power OFF the following equipment:

        (1)   Unclassified Console Switch

        (2)   Unclassified Console Switch Monitor

    c.   Cover machines to protect them from dust and moisture, if required.

3-16.   CLASSIFIED SYSTEM OPERATING SYSTEM SHUTDOWN (ORDER-SPECIFIC).

    a.   From Classified Console Switch monitor, press and release the keyboard left
<**Control**> key, then type **1** using the number key at the top of the keyboard. DO NOT use
the keypad numbers and DO NOT press return. Wait for the Console Switch to change
ports.

    b.   Login to wfsa as lgmaint.

    c.   Open an xterm window.

d.   Remotely login (using rlogin, rsh, or telnet) to the Classified DAM Station (cdam).

e.   At the cdam{lgmain} prompt, type:

haltsys⏎

YOU HAVE REQUESTED TO SHUTDOWN: cdam

Are you sure you want to continue?
 <yes / no>

yes⏎

Connection Closed

f.   Repeat the previous two steps for the following machines:

(1)   Evaluator Stations (eval1 - eval6)

(2)   Analyst Stations (analyst1 - analyst6)

(3)   Pipeline Processors (pipe1a - pipe8a)

(4)   DB Admin Station (dbadmin)

(5)   SOM Station (som1)

(6)   Sys/Net Admin Station (sysadmin)

g.   From the xterm window, remotely login (using rlogin, rsh, or telnet) to the Pipeline DB Server (cdbsa).

h.   At the cdbsa{lgmaint} prompt, type:

haltsys⏎

YOU HAVE REQUESTED TO SHUTDOWN: cdbsa

Are you sure you want to continue?
 <yes / no>

yes⏎

**This machine is critical to network operation. If you really want
to shut this system down, type its name:

cdbsa↵

Connection Closed

     i.   From the xterm window, remotely login (using rlogin, rsh, or telnet) to the Classified Archive/DB Server (carch).

     j.   At the `carch{lgmaint}` prompt, type:

haltsys↵

YOU HAVE REQUESTED TO SHUTDOWN: carch

Are you sure you want to continue?
 <yes / no>

yes↵

**This machine is critical to network operation. If you really want to shut this system down, type its name:

carch↵

Connection Closed

     k.   From the Classified Console Switch Monitor, press and release the keyboard left <**Control**> key, then type **s**. DO NOT press return. The Console Switch will cycle through each of the headless machines (ie., pipe1a - pipe8a, carch, wfsa and cdbsa).

     l.   Ensure all headless processors are at the boot prompt with the exception of wfsa.

> ### CAUTION
>
> *To prevent files system damage, ensure all processors are at boot prompt before shutting down the Waveform Server (wfsa).*

     m.   After all headless machines are at the boot prompt, press and release the keyboard left <**Control**> key, then type **1**.

     n.   From the wfsa{lgmaint} prompt, type:

YOU HAVE REQUESTED TO SHUTDOWN: wfsa

```
Are you sure you want to continue?
 <yes / no>
```

yes↵

```
**This machine is critical to network operation. If you really want
to shut this system down, type its name:
```

wfsa↵

```
Connection Closed
```

     o.   Wait for boot prompt before continuing.

3-17.   CLASSIFIED SYSTEM HARDWARE POWER OFF (NOT ORDER-SPECIFIC).

> **CAUTION**
>
> *Ensure each station monitor is displaying a boot prompt prior to powering OFF, or damage to the system files may occur.*

     a.   Power OFF each computer and then its associated peripherals as follows:

     (1)   Pipeline Processors (pipe1a - pipe8a)

     (2)   Pipeline DB Server (cdbsa)

     (3)   Classified Archive/DB Server (carch)

        (a)   Power off the L280 peripheral, using steps (b) through (g).

        (b)   Press **Next** button on front panel.

        (c)   Press **Enter**.

        (d)   Wait until display indicates door released.

        (e)   Open door.

        (f)   Turn OFF power switch.

        (g)   Close door.

        (h)   Turn OFF power switch on rear of DLT tape drive.

(4)   Waveform Server (wfsa)

       (a)   Power OFF the A3500 peripheral, using steps (b) through (g).

       (b)   Open back door of rack.

       (c)   Turn OFF main power breaker on power sequencer (bottom rear box).

       (d)   Close rear door.

CAUTION

Due to wires connected to the keyswitch, use care removing panel.

       (e)   Loosen four captive screws on lowest front panel.

       (f)   Set panel aside and turn OFF main power breaker on power sequencer (bottom front box).

       (g)   Replace panel and secure screws.

(5)   Sys/Net Admin Station (sysadmin)

(6)   DB Admin Station (dbadmin)

(7)   Evaluator Stations (eval1 - eval6)

(8)   Analyst Stations (analyst1 - analyst6)

(9)   SOM Station (som1)

(10) Classified DAM Station (cdam)

b.   Power OFF the following equipment:

(1)   Printers

(2)   Classified Console Switch

(3)   Classified Console Switch Monitor

c.   Cover machines to protect them from dust and moisture, if required.

3-18.   C2 GUARD SHUTDOWN (ORDER-SPECIFIC).

- - NOTE - -

To perform the following steps, the XTS-300 Controller operator account password must be known.

a.   From XTS-300 console, press **<Alt><Print Scrn>** to display prompt.

b.   At the `Enter user name` prompt, login as operator by typing:

?**operator**↵

c.   At the `Enter password` prompt, enter the operator password. The following display will appear:

```
Login complete on console at <current date and time>
Last login was on console at <last login date and time>
Initial level is sec lvl 15(C2G_admin, C2G_Status, REF1, sc3, sc4,
sc5, sc6, sc7, sc8, sc9, sc10, sc11, sc12, sc13, sc14, sc15, sc16,
sc16, sc17, sc18, sc19, sc20, sc21, sc22, sc23, sc24, sc25, sc26,
sc27, sc28, sc29, sc30, sc31, sc32, sc33, sc34, sc35, sc36, sc37,
sc38, sc39, sc40, sc41, sc42, sc43, sc44, sc45, sc46, sc47, sc48,
sc49, sc50, sc51, sc52, sc53, sc54, sc55, sc56, sc57, sc58, sc50,
sc60, sc61, sc62, sc63) Operator
```

d.   Press **<Alt><Print Scrn>** to display prompt.

e.   At the `Enter command` prompt, enter the C2G environment by typing:

?**c2g**↵

C2G is running

Queue:	State	Host	QSND	FGET	IVM	ENF	OVM	FPUT	QRVC	Host
q1	Run	high	Run	Run	Run	Run	Run	Run	Run	low
q2	Halt	high	Stop	Stop	Stop	Stop	Stop	Stop	Stop	low

f.   At the `Enter Guard request` prompt, stop the C2G process by typing:

?**stop**↵

g.   The following display will appear in approximately one minute. The first line may or may not appear.

```
C2G fsw_control did not respond in 60 seconds.
C2G Soft termination started.
q1 terminated
Queue q1 terminated
C2g terminated.
```

h.   At the `Enter Guard request` prompt, exit the C2G environment by typing:

?**exit**↵

i.   Press **<Alt><Print Scrn>** to display prompt.

j.   At the `Enter command` prompt, shut down the XTS-300 operating system by typing:

?**shutdown**↵
```
Shutdown is in progress.
Reason for shutdown: shutdown requested by operator at console.
Sync was complete
```

> ```
> ┌──────────┐
> │ CAUTION  │
> └──────────┘
> ```
>
> *DO NOT power down until the* `Sync  was  complete` *message is displayed or severe hard disk damage may result.*

k.   On the XTS-300, press the **Power A** and **Power B** buttons simultaneously.

l.   From the Unclassified C2 Guard (lqmgr), login with lgmaint account.

m.   Shut down the Unclassified C2 Guard. At prompt, type:

n.   From the Classified C2 Guard (hqmgr), login with lgmaint account, and shut down the Classified C2 Guard. At prompt, type:

haltsys↵

```
YOU HAVE REQUESTED TO SHUTDOWN: hqmgr

Are you sure you want to continue?
 <yes / no>
```

yes↵

```
Connection Closed
```

3-19.   C2 GUARD HARDWARE POWER OFF (NOT ORDER-SPECIFIC).

a.   Power OFF each computer and its associated peripherals as follows:

(1)   Unclassified C2 Guard Interface (lqmgr)

(2)   Classified C2 Guard Interface (hqmgr)

b.   Power OFF the following equipment:

(1)   XTS-300 15 inch monitor

(2)   Both XTS-300 ASCII terminal monitors

(3)   XTS-300 laser printer

c.   Cover machines to protect them from dust and moisture, if required.

3-20.   PARTIAL SHUTDOWN/POWER OFF PROCEDURES.

3-21.   It may be necessary to shut down/power off Unclassified or Classified Systems, or an individual component to perform maintenance, configuration changes, equipment upgrades, etc. If the Unclassified System must be shut down temporarily, the Classified System can remain operational. However, when the Unclassified System is off-line, the Classified System cannot receive any additional data for processing, except for that data which is received directly by the classified side. If the Classified System must be shut down temporarily, the Unclassified System should remain operational for continued data collection. Specific shutdown procedures are provided in the following paragraphs.

3-22.   While some components of the Unclassified or Classified Systems can be shut down and/or powered down individually or in conjunction with others without affecting operations, other components can only be shut down and/or powered down during total system shutdown.

3-23.   UNCLASSIFIED SYSTEM.

3-24.   To shut down, power off, or reactivate an Unclassified System component, locate component in first column table 3-1, then refer to the procedure listed in second column.

Table 3-1. Unclassified US NDC Shutdown/Power Off Procedure References

UNCLASSIFIED NDC COMPONENT	SHUTDOWN/POWER OFF PROCEDURE
Unclassified DAM Station (udam)	Paragraph 3-25.
Sys/Net/DB Admin Station (usysadmin)	Paragraph 3-26.
DNS/Mail Server (ndcadmin)	Paragraph 3-27.
Unclassified C2 Guard Interface (lqmgr)	Paragraph 3-28.
Unclassified Archive DB Server (uarch)	Paragraph 3-29.
Diskloop Server (dlsa)	Paragraph 3-30.

3-25.   UNCLASSIFIED DAM STATION (udam).

    a.   Shutdown/Power Off:

        (1)   Ensure all users have logged off.

        (2)   Login using root or lgmaint account.

        (3)   At prompt, type:

`haltsys`↵

```
Are you sure you want to continue?
<yes / no>
```

`yes`↵

        (4)   If required, power OFF computer.

        (5)   If required, power OFF associated peripherals.

        (6)   Perform required maintenance.

    b.   Reactivation:

        (1)   If station is powered off, refer to power on procedures in paragraph 2-14, then perform the following:

        (2)   If station is **NOT** powered off, type **`boot`**↵ at `OK` prompt or **`b`**↵ at > prompt to reboot operating system.

3-26.   SYS/NET/DB ADMIN STATION (usysadmin).

     a.   Shutdown/Power Off:

          (1)   Ensure all users have logged off.

          (2)   At Sys/Net/DB Admin Station, login using root or lgmaint account.

          (3)   At prompt, type:

```
haltsys↵
```

```
Are you sure you want to continue?
<yes / no>
```

```
yes↵
```

          (4)   If required, power OFF computer.

          (5)   If required, power OFF associated peripherals.

          (6)   Perform required maintenance.

     b.   Reactivation:

          (1)   If station is powered off, refer to power on procedures in paragraph 2-15.

          (2)   If station is **NOT** powered off, type `boot↵` at `OK` prompt or `b↵` at > prompt to reboot operating system.

3-27.   DNS/MAIL SERVER (ndcadmin) AND MULTIDISK PACKS.

     a.   Shutdown/Power Off:

          (1)   From the Unclassified DAM Station Front Launch window, stop all processes.

          (2)   In the Unclassified DA Launch window, stop all File2Alpha processes.

          (3)   Log out of udam.

          (4)   If required, power OFF DNS/Mail Server.

          (5)   If required, power OFF associated MultiPacks.

          (6)   Perform required maintenance.

b. Reactivation:

(1) If MultiPack(s) and DNS/Mail Server are powered off, refer to power on procedures in paragraph 2-10.

(2) If MultiPack(s) and DNS/Mail Server are **NOT** powered off, type **boot↵** at OK prompt or **b↵** at > prompt to reboot operating system.

(3) From the unclassified DAM Front Launch window, **Start** all processes.

(4) From the unclassified DAM Launch window, **Start** all File2Alpha processes.

(5) In the unclassified DAM Archive Launch window, **Start** the three archive processes.

3-28. UNCLASSIFIED C2 GUARD INTERFACE (lqmgr).

a. Shutdown/Power Off:

(1) From XTS-300 console, press **<Alt><Print Scrn>** to display prompt.

(2) At the Enter user name prompt, login as operator by typing:

?**operator↵**

(3) At the Enter password prompt, enter the operator password. The following display will appear:

```
Login complete on console at <current date and time>
Last login was on console at <last login date and time>
Initial level is sec lvl 15(C2G_admin, C2G_Status, REF1, sc3, sc4,
sc5, sc6, sc7, sc8, sc9, sc10, sc11, sc12, sc13, sc14, sc15, sc16,
sc16, sc17, sc18, sc19, sc20, sc21, sc22, sc23, sc24, sc25, sc26,
sc27, sc28, sc29, sc30, sc31, sc32, sc33, sc34, sc35, sc36, sc37,
sc38, sc39, sc40, sc41, sc42, sc43, sc44, sc45, sc46, sc47, sc48,
sc49, sc50, sc51, sc52, sc53, sc54, sc55, sc56, sc57, sc58, sc50,
sc60, sc61, sc62, sc63) Operator
```

(4) Press **<Alt><Print Scrn>** to display prompt.

(5) At the Enter command prompt, enter the C2G environment by typing:

?**c2g↵**

C2G is running

```
Queue: State   Host QSND FGET  IVM  ENF  OVM  FPUT QRVC  Host

  q1   Run    high Run  Run   Run  Run  Run  Run  Run   low

  q2   Halt   high Stop Stop  Stop Stop Stop Stop Stop  low
```

        (6)   At the `Enter Guard request` prompt, stop the C2G process by typing:

?**stop**↵

        (7)   The following display will appear in approximately one minute. The first line may or may not appear.

```
C2G fsw_control did not respond in 60 seconds.
C2G Soft termination started.
q1 terminated
Queue q1 terminated
C2g terminated.
```

        (8)   From the Unclassified C2 Guard (lqmgr), login as lgmaint.

        (9)   At prompt, type:

haltsys↵

```
Are you sure you want to continue?
<yes / no>
```

yes↵

        (10) If required, power OFF computer.

        (11) If required, power OFF associated peripherals.

        (12) Perform required maintenance.

   b.   Reactivation:

        (1)   If powered off, power ON monitor.

        (2)   If computer is powered off, refer to power on and startup procedures in paragraph 2-16.

        (3)   If computer is **NOT** powered off, type **boot**↵ at `OK` prompt or **b**↵ at > prompt to reboot operating system.

(4)   From XTS-300 console, at the `Enter Guard request` prompt, start the c2g process by typing:

?**start**⏎

```
starting the Guard...
C2G started.
Start OK.
```

(5)   Login to Classified C2 Guard Station (hqmgr) as root or lgmaint.

(6)   To determine if qmainv process is running, type:

tail /usr/qmgr/sqmrd/.log⏎

(7)   The message `q_main: qmainv processing started` should appear in the output.

(8)   Log out.

(9)   Perform steps (6) through (8) on Unclassified C2 Guard (lqmgr).

(10)   At the `Enter Guard request` prompt on the XTS-300 console, start queue1 by typing:

?**start q1**⏎

```
q1 loaded
q1 started
queue q1 started.
```

(11)   At the `Enter Guard request` prompt, check the status of the c2g process by typing:

?**status**⏎

```
C2G is running
```

Queue:	State	Host	QSND	FGET	IVM	ENF	OVM	FPUT	QRVC	Host
q1	Run	high	Run	Run	Run	Run	Run	Run	Run	low
q2	Halt	high	Stop	Stop	Stop	Stop	Stop	Stop	Stop	low

(12)   At the `Enter Guard request` prompt, exit the C2G environment by typing:

`?`**`exit`**↵

       (13) Press **<Alt><Print Scrn>** to display prompt.

       (14) At `Enter Command` prompt, log off by typing:

`?`**`logout`**↵

`Logout complete`

3-29.   UNCLASSIFIED ARCHIVE SERVER (uarch).

CAUTION

Disabling the Unclassified Archive Server will halt all data archiving on the Unclassified System.

    a.   Shutdown/Power Off:

       (1)   On Unclassified DAM in the Archive Launch window, **Stop** the three archive processes.

       (2)   At the Unclassified Console Switch, login to the Unclassified Archive Server as root or lgmaint.

CAUTION

If any problems are experienced with the Oracle database during system shutdown, contact DB Administration.

       (3)   At prompt, type:

`#` **`haltsys`**↵

`YOU HAVE REQUESTED TO SHUTDOWN: uarch`

`Are you sure you want to continue?`
 `<yes / no>`

`yes`↵

```
**This machine is critical to network operation. If you really want
to shut this system down, type its name:

uarch↵
```

      (4)   If required, power OFF computer.

      (5)   If required, power OFF associated peripherals.

      (6)   Perform required maintenance.

   b.   Reactivation:

      (1)   If powered off, power ON associated peripherals.

      (2)   If computer is powered off, refer to power on procedures in paragraph 2-12.

      (3)   If computer is **<u>NOT</u>** powered off, type **boot**↵ at OK prompt or **b**↵ at > prompt to reboot operating system.

      (4)   In the unclassified DAM Data Acquisition Launch window, right-click on **uarch** and select **StartLaunchd**.

      (5)   In the unclassified DAM Archive Launch window, **Start** the three archive processes.

3-30.   DISKLOOP SERVER (dlsa).

CAUTION

Shutting down dlsa will interrupt all unclassified data acquisition.

   a.   Shutdown/Power Off:

      (1)   In unclassified DAM Data Acquisition Launch window, stop all processes on all loop machines by right-clicking on the appropriate host machine button and selecting all **Stop** menu items.

      (2)   In the DA Launch window, **Stop** all processes which remain green and blue.

      (3)   At the Unclassified Console Switch, login to Diskloop Server (port 2) as root or lgmaint.

(4)   At prompt, type:

```
# haltsys↵

YOU HAVE REQUESTED TO SHUTDOWN: dlsa

Are you sure you want to continue?
 <yes / no>

yes↵

**This machine is critical to network operation. If you really want
to shut this system down, type its name:

dlsa↵
```

(5)   If required, power OFF computer.

(6)   Perform required maintenance.

b.   Reactivation:

(1)   If computer is powered off, refer to power on procedures in paragraph 2-11.

(2)   If computer is **NOT** powered off, type **boot**↵ at OK prompt or **b**↵ at > prompt to reboot operating system.

(3)   In unclassified DAM Data Acquisition Launch window, start all processes on dlsa and ndcadmin by right-clicking on the appropriate host machine button and selecting all **Start** menu items.

(4)   In unclassified DAM Data Acquisition Launch window, **Start** all processes which remain red.

3-31. CLASSIFIED SYSTEM.

3-32.   To shut down, power off, or reactivate a Classified System component, locate component in first column of table 3-2, then refer to the procedure listed in second column.

Table 3-2. Classified US NDC Shutdown/Power Off Procedure References

CLASSIFIED NDC COMPONENT	SHUTDOWN/POWER OFF PROCEDURE
Analyst Stations (analyst1 - analyst6)	Perform paragraph 3-33.
Classified DAM Station (cdam)	Perform paragraph 3-33.
DB Admin Station (dbadmin)	Perform paragraph 3-33.
Evaluator Stations (eval1 - eval6)	Perform paragraph 3-33.
SOM Station (som1)	Perform paragraph 3-33.
Sys/Net Admin Station (sysadmin)	Perform paragraph 3-33.
Pipeline Processors (pipe1a - pipe8a)	Perform paragraph 3-34.
Classified C2 Guard Interface (hqmgr)	Perform paragraph 3-35.
Waveform Server (wfsa)	Perform paragraph 3-36.
Pipeline DB Server (cdbsa)	Perform paragraph 3-37.
Classified Archive/DB Server (carch)	Perform paragraph 3-38.
C2 Guard XTS 300 Controller	Perform paragraph 3-39.

3-33.   PROCEDURE I.

    a.   Shutdown/Power Off:

        (1)   Ensure all users have logged off the machine to be shut down.

        (2)   Login on station to be shut down using root or lgmaint account.

        (3)   At prompt, type:

`haltsys`↵

```
Are you sure you want to continue?
<yes / no>

yes↵
```

       (4)   If required, power OFF computer.

       (5)   If required, power OFF associated peripherals.

       (6)   Perform required maintenance.

    b.   Reactivation:

       (1)   If station is powered off, refer to appropriate power on procedure in paragraph 2-20.

       (2)   If station is **NOT** powered off, type **boot**↵ at OK prompt or **b**↵ at > prompt to reboot operating system.

       (3)   Inform SOM and/or Classified DAM the station is operational.

3-34.   PROCEDURE II.

    a.   Shutdown/Power Off:

CAUTION

Performing the following procedure will interrupt pipeline data flow between Unclassified System and Classified System.

       (1)   Ensure SOM has halted all associated processing on machine to be shut down, stopped all associated processes, and exited session.

       (2)   At the Classified Console Switch, login to the machine to be shut down using root or lgmaint account.

    b.   Reactivation:

       (1)   If station is powered off, refer to appropriate power on procedure in paragraph 2-20.

       (2)   If station is **NOT** powered off, type **boot**↵ at OK prompt or **b**↵ at > prompt to reboot operating system.

        (3)   Inform SOM and Classified DAM the station is operational and processes can be reactivated.

3-35.   PROCEDURE III.

      a.   Shutdown/Power Off:

        (1)   From XTS-300 console, press **\<Alt\>\<Print Scrn\>** to display prompt.

        (2)   At the `Enter user name` prompt, login as operator by typing:

`?`**`operator`**↵

        (3)   At the `Enter  password` prompt, enter the operator password. The following display will appear:

```
Login complete on console at <current date and time>
Last login was on console at <last login date and time>
Initial level is sec lvl 15(C2G_admin, C2G_Status, REF1, sc3, sc4,
sc5, sc6, sc7, sc8, sc9, sc10, sc11, sc12, sc13, sc14, sc15, sc16,
sc16, sc17, sc18, sc19, sc20, sc21, sc22, sc23, sc24, sc25, sc26,
sc27, sc28, sc29, sc30, sc31, sc32, sc33, sc34, sc35, sc36, sc37,
sc38, sc39, sc40, sc41, sc42, sc43, sc44, sc45, sc46, sc47, sc48,
sc49, sc50, sc51, sc52, sc53, sc54, sc55, sc56, sc57, sc58, sc50,
sc60, sc61, sc62, sc63) Operator
```

        (4)   Press **\<Alt\>\<Print Scrn\>** to display prompt.

        (5)   At the `Enter command` prompt, enter the C2G environment by typing:

`?`**`c2g`**↵

```
Queue:State  Host QSND FGET IVM   ENF   OVM  FPUT QRVC  Host

  q1   Run    high Run  Run   Run  Run  Run  Run  Run   low

  q2   Halt   high Stop Stop  Stop Stop Stop Stop Stop  low
```

        (6)   At the `Enter Guard request` prompt, stop the C2G process by typing:

`?`**`stop`**↵

        (7)   The following display will appear in approximately one minute. The first line may or may not appear.

```
C2G fsw_control did not respond in 60 seconds.
C2G Soft termination started.
```

```
q1 terminated
Queue q1 terminated
C2g terminated.
```

        (8)   From the Classified C2 Guard Interface (hqmgr), login as lgmaint.

        (9)   At prompt, type:

haltsys↵

```
Are you sure you want to continue?
<yes / no>
```

yes↵

        (10) Power OFF computer.

        (11) Perform required maintenance.

    b.   Reactivation:

        (1)   Power ON computer IAW procedure in paragraph 2-34.

        (2)   From XTS-300 console, at the `Enter Guard request` prompt, start the c2g process by typing:

```
?start↵
starting the Guard...
C2G started.
Start OK.
```

        (3)   Login to Classified C2 Guard Station (hqmgr) as root or lgmaint.

        (4)   To determine if qmainv process is running, type:

tail /usr/qmgr/sqmrd/.log ↵

        (5)   The message `q_main:  qmainv  processing  started` should appear in the output.

        (6)   Log out.

        (7)   Perform steps (4) through (6) on Unclassified C2 Guard (lqmgr).

(8)   At the `Enter Guard request` prompt on the XTS-300 console, start queue1 by typing:

?**start q1**↵

q1 loaded

q1 started

queue q1 started.

(9)   At the `Enter Guard request` prompt, check the status of the c2g process by typing:

?**status**↵

C2G is running

Queue:	State	Host	QSND	FGET	IVM	ENF	OVM	FPUT	QRVC	Host
q1	Run	high	Run	Run	Run	Run	Run	Run	Run	low
q2	Halt	high	Stop	Stop	Stop	Stop	Stop	Stop	Stop	low

(10) At the `Enter Guard request` prompt, exit the C2G environment by typing:

?**exit**↵

(11) Press **<Alt><Print Scrn>** to display prompt.

(12) At `Enter Command` prompt, log off by typing:

?**logout**↵

Logout complete

3-36.   PROCEDURE IV.

   a.   Shutdown/Power Off:

<div style="text-align:center">

```
┌─────────────────┐
│    CAUTION      │
└─────────────────┘
```

</div>

Disabling the Waveform Server will halt all data acquisition and pipeline processing on the Classified System.

   (1)   Contact SOM to perform a Graceful Pipeline Shutdown in accordance with (IAW) TI 2-NDC-1. Ensure launchd processes are stopped on the Pipeline Processors.

   (2)   In the unclassified DA Launch window, **Stop** Diode Send process.

   (3)   Shut down classified Pipeline DB Server and all Pipeline Processors IAW table 3-2.

   (4)   At the Classified Console Switch, login to the Waveform Server (port 1) as root or lgmaint.

   (5)   At prompt, type:

```
# haltsys↵

YOU HAVE REQUESTED TO SHUTDOWN: wfsa

Are you sure you want to continue?
 <yes / no>

yes↵

**This machine is critical to network operation. If you really want
to shut this system down, type its name:

wfsa↵
```

   (6)   If required, power OFF server IAW paragraph 3-17.

   (7)   If required, power OFF any peripherals which maintenance will be performed on IAW paragraph 3-17.

   (8)   Perform required maintenance.

b. Reactivation:

(1) If computer is powered off, power ON IAW paragraph 2-22.

(2) If computer is **<u>NOT</u>** powered off, type **boot↵** at OK prompt or **b↵** at > prompt to reboot operating system.

(3) Boot cdbsa and pipe1a - pipe7a by typing **boot↵** at OK prompt or **b↵** at > prompt to reboot operating system.

(4) Contact SOM to perform Pipeline Start-up Procedures IAW TI 2-NDC-1.

(5) In the unclassified DA Launch window, **Start** Diode Send process.

3-37. PROCEDURE V.

```
     ┌─────────────────┐
     │     CAUTION     │
     └─────────────────┘
```

Disabling the Pipeline DB Server will halt all data acquisition and pipeline processing on the Classified System.

a. Shutdown/Power Off:

(1) Ensure launchd processes are stopped on the Pipeline Processors.

(2) Contact SOM to perform a Graceful Pipeline Shutdown in accordance with (IAW) TI 2-NDC-1.

(3) In the unclassified DA Launch window, **Stop** Diode Send process.

(4) Shut down pipe1a - pipe8a IAW table 3-2.

(5) At the Classified Console Switch, login to the Pipeline DB Server (port 2) as root or lgmaint.

(6) At prompt, type:

```
# haltsys↵

YOU HAVE REQUESTED TO SHUTDOWN: cdbsa

Are you sure you want to continue?
 <yes / no>

yes↵
```

```
**This machine is critical to network operation. If you really want
to shut this system down, type its name:
```

cdbsa↵

       (7)   If required, power OFF server IAW paragraph 3-17.

       (8)   If required, power OFF any peripherals which maintenance will be performed on IAW paragraph 3-17.

       (9)   Perform required maintenance.

   b.   Reactivation:

       (1)   If computer is powered off, power ON IAW paragraph 2-24.

       (2)   If computer is **<u>NOT</u>** powered off, type **boot**↵ at OK prompt or **b**↵ at > prompt to reboot operating system.

       (3)   Boot pipe1a - pipe8a by typing **boot**↵ at OK prompt or **b**↵ at > prompt to reboot operating system.

       (4)   Contact SOM to perform Pipeline Start-up Procedures IAW TI 2-NDC-1.

       (5)   In the unclassified DA Launch window, **Start** Diode Send.

3-38.   PROCEDURE VI.

> **CAUTION**

*Disabling the Classified Archive Server will interrupt all classified data
archiving operations.*

   a.   Shutdown/power OFF:

       (1)   On Classified DAM in the Archive Launch window, **Stop** the two archive processes.

       (2)   At the Classified Console Switch, login to the Classified Archive Server as root or lgmaint.

       (3)   At prompt, type:

haltsys↵

```
Are you sure you want to continue?
<yes / no>
```

yes↵

        (4)   If required, power OFF server IAW paragraph 3-17.

        (5)   Power OFF associated peripherals IAW paragraph 3-17.

        (6)   Perform required maintenance.

   b.   Reactivation:

        (1)   If computer is powered off, power ON IAW paragraph 2-31.

        (2)   If computer is **NOT** powered off, type **boot**↵ at OK prompt or **b**↵ at > prompt to reboot operating system.

        (3)   In the classified DAM Data Acquisition Launch window, right-click on arcdbs and select **StartLaunchd**.

        (4)   In the classified DAM Archive Launch window, **Start** the two archive processes.

3-39.   PROCEDURE VII.

   a.   Shutdown/Power Off:

        (1)   From XTS-300 console, press **<Alt><Print Scrn>** to display prompt.

        (2)   At the Enter user name prompt, login as operator by typing:

?**operator**↵

        (3)   At the Enter password prompt, enter the operator password. The following display will appear:

```
Login complete on console at <current date and time>
Last login was on console at <last login date and time>
Initial level is sec lvl 15(C2G_admin, C2G_Status, REF1, sc3, sc4,
sc5, sc6, sc7, sc8, sc9, sc10, sc11, sc12, sc13, sc14, sc15, sc16,
sc16, sc17, sc18, sc19, sc20, sc21, sc22, sc23, sc24, sc25, sc26,
sc27, sc28, sc29, sc30, sc31, sc32, sc33, sc34, sc35, sc36, sc37,
sc38, sc39, sc40, sc41, sc42, sc43, sc44, sc45, sc46, sc47, sc48,
sc49, sc50, sc51, sc52, sc53, sc54, sc55, sc56, sc57, sc58, sc50,
sc60, sc61, sc62, sc63) Operator
```

(4)   Press **<Alt><Print Scrn>** to display prompt.

(5)   At the `Enter command` prompt, enter the C2G environment by typing:

`?`**`c2g`**↵

C2G is running

Queue:	State	Host	QSND	FGET	IVM	ENF	OVM	FPUT	QRVC	Host
q1	Run	high	Run	Run	Run	Run	Run	Run	Run	low
q2	Halt	high	Stop	Stop	Stop	Stop	Stop	Stop	Stop	low

(6)   At the `Enter Guard request` prompt, stop the C2G process by typing:

`?`**`stop`**↵

(7)   The following display will appear in approximately one minute. The first line may or may not appear.

C2G fsw_control did not respond in 60 seconds.
C2G Soft termination started.
q1 terminated
Queue q1 terminated
C2g terminated.

(8)   At the `Enter Guard request` prompt, exit the C2G environment by typing:

`?`**`exit`**↵

(9)   Press **<Alt> <Print Scrn>** to display prompt.

(10)   At the `Enter  command` prompt, shut down the XTS-300 operating system by typing:

`?`**`shutdown`**↵
Shutdown is in progress.
Reason for shutdown: shutdown requested by operator at console.
Sync was complete

DO NOT power down until the `Sync was complete` *message is displayed or severe hard disk damage may result.*

(11) On the XTS-300, press the **Power A** and **Power B** buttons simultaneously.

(12) If necessary, power OFF peripherals.

(13) Perform required maintenance.

b.   Reactivation: Power ON XTS-300 IAW procedure in paragraph 2-35.

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SECTION III

EMERGENCY OPERATIONS

3-40.   INTRODUCTION.

3-41.   This section provides emergency shutdown procedures for the US NDC. These emergency procedures should be followed if the US NDC is facing a catastrophic failure.

3-42.   EMERGENCY SHUTDOWN PROCEDURES.

      a.   Request SOM to instruct users to disconnect from all databases.

- - NOTE - -

Database servers can be shut down simultaneously.

      b.   Shut down database servers (cdbsa, carch, dlsa, and uarch, respectively) as follows:

      (1)   Ensure SOM has halted pipeline, killed all associated processes on servers, and exited session.

      (2)   Login to each machine using root or lgmaint account.

      (3)   At prompt, type:

```
haltsys↵

Are you sure you want to continue?
<yes / no>

yes↵

**This machine is critical to network operation. If you really want
to shut this system down, type its name:
```

<machine name>↵ (Where <machine name> = applicable machine name)

      (4)   Power OFF computer.

      (5)   Power OFF associated peripherals.

c.   Shut down the XTS-300 System Console keyboard as follows:

(1)   From XTS-300 console, press **<Alt><Print Scrn>** to display prompt.

(2)   At the `Enter user name` prompt, login as operator by typing:

`?`**`operator`**↵

(3)   At the `Enter password` prompt, enter the operator password. The following display will appear:

```
Login complete on console at <current date and time>
Last login was on console at <last login date and time>
Initial level is sec lvl 15(C2G_admin, C2G_Status, REF1, sc3, sc4,
sc5, sc6, sc7, sc8, sc9, sc10, sc11, sc12, sc13, sc14, sc15, sc16,
sc16, sc17, sc18, sc19, sc20, sc21, sc22, sc23, sc24, sc25, sc26,
sc27, sc28, sc29, sc30, sc31, sc32, sc33, sc34, sc35, sc36, sc37,
sc38, sc39, sc40, sc41, sc42, sc43, sc44, sc45, sc46, sc47, sc48,
sc49, sc50, sc51, sc52, sc53, sc54, sc55, sc56, sc57, sc58, sc50,
sc60, sc61, sc62, sc63) Operator
```

(4)   Press **<Alt><Print Scrn>** to display prompt.

(5)   At the `Enter command` prompt, enter the C2G environment by typing:

`?`**`c2g`**↵

```
C2G is running

Queue:State  Host QSND FGET  IVM   ENF   OVM  FPUT QRVC  Host
  q1   Run      high Run  Run   Run  Run   Run  Run  Run   low
  q2   Halt     high Stop Stop  Stop Stop  Stop Stop Stop  low
```

(6)   At the `Enter Guard request` prompt, stop the C2G process by typing:

`?`**`stop`**↵

(7)   The following display will appear in approximately one minute. The first line may or may not appear.

```
C2G fsw_control did not respond in 60 seconds.
C2G Soft termination started.
q1 terminated
Queue q1 terminated
C2g terminated.
```

(8)   At the `Enter Guard request` prompt, exit the C2G environment by typing:

`?`**`exit`**↵

(9)   Press **<Alt><Print Scrn>** to display prompt.

(10)   At the `Enter command` prompt, shut down the XTS-300 operating system by typing:

`?`**`shutdown`**↵

CAUTION

DO NOT power down until the `Sync was complete` *message is displayed or severe hard disk damage may result.*

---

(11)   On the XTS-300, press the **Power A** and **Power B** buttons simultaneously.

d.   Shut down Unclassified Archive Server (uarch).

(1)   Login using root or lgmaint account.

(2)   At prompt, type:

`#` **`haltsys`**↵

`YOU HAVE REQUESTED TO SHUTDOWN: uarch`

`Are you sure you want to continue?`
` <yes / no>`

`yes`↵

`**This machine is critical to network operation. If you really want`
`to shut this system down, type its name:`

`uarch`↵

(3)   Power OFF computer.

(4)   Power OFF associated peripherals.

e. Shut down Waveform Server (wfsa).

    (1) Login using root or lgmaint account.

    (2) At prompt, type:

```
# haltsys↵

YOU HAVE REQUESTED TO SHUTDOWN: wfsa

Are you sure you want to continue?
 <yes / no>

yes↵

**This machine is critical to network operation. If you really want
to shut this system down, type its name:

wfsa↵
```

    (3) Power OFF computer.

    (4) Power OFF associated peripherals.

f. Shut down Classified Archive Server (carch).

    (1) Login using root or lgmaint account.

    (2) At prompt, type:

```
# haltsys↵

YOU HAVE REQUESTED TO SHUTDOWN: carch

Are you sure you want to continue?
 <yes / no>

yes↵

**This machine is critical to network operation. If you really want
to shut this system down, type its name:

carch↵
```

    (3) Power OFF computer.

(4)   Power OFF associated peripherals.

g.   Shut down DNS/Mail Server (ndcadmin).

(1)   Login using root or lgmaint account.

(2)   At prompt, type:

```
# haltsys↵

YOU HAVE REQUESTED TO SHUTDOWN: ndcadmin

Are you sure you want to continue?
 <yes / no>

yes↵

**This machine is critical to network operation. If you really want
to shut this system down, type its name:

ndcadmin↵
```

(3)   Power OFF computer.

(4)   Power OFF associated peripherals.

h.   Power OFF each remaining computer and then its associated peripherals. See list below (not order-specific).

(1)   Unclassified DAM Station (udam)

(2)   Sys/Net/DB Admin Station (usysadmin)

(3)   Unclassified C2 Guard Interface (lqmgr)

(4)   Evaluator Stations (eval1 - eval6)

(5)   Analyst Stations (analyst1 - analyst6)

(6)   Pipeline Processors (pipe1a - pipe8a)

(7)   DB Admin Station (dbadmin)

(8)   SOM Station (som1)

(9)   Classified DAM Station (cdam)

         (10)   Sys/Net Admin Station (sysadmin)

         (11)   Classified C2 Guard Interface (hqmgr)

    i.   Power OFF the following equipment (not order-specific):

         (1)   Unclassified Console Switch

         (2)   Unclassified Console Switch monitor

         (3)   Printers

         (4)   Classified Console Switch

         (5)   Classified Console Switch monitor

    j.   Power OFF all US NDC power center extension circuit breakers on each rack.

    k.   Power OFF circuit breakers of Panels x through x on US NDC Power Distribution Unit-3 as shown in figure 7-4.

3-43.   CATASTROPHIC FAILURE RECOVERY.

3-44.   In the event of a catastrophic power failure to US NDC, follow procedures below to minimize system damage and data loss.

    a.   Make sure circuit breakers are OFF on Power Distribution Unit 3, Panels x through x, as shown in figure 7-4.

    b.   Make sure all US NDC equipment, peripherals, and stations have been turned OFF.

    c.   Check with Facilities Manager or Civil Engineering to determine power status.

> **CAUTION**

> *When circuit breakers have been turned back on, DO NOT turn on any components or systems until stable power has been re-established.*

    d.   Turn ON circuit breakers shown in figure 7-4.

    e.   Once circuit breakers have been turned back on, bring systems back on-line following power-up procedures contained in chapter 2.

CHAPTER 4

PRINCIPLES OF OPERATION

4-1.   INTRODUCTION.

4-2.   Chapter 4 provides a system overview and a functional description of the United States National Data Center (US NDC). A thorough understanding of the function of the hardware components, the software, and the data flow between system components is critical to performing system administration and maintenance. This chapter is divided into five sections as follows:

      a.   Section I presents a system overview.

      b.   Section II provides a functional description of the hardware.

      c.   Section III provides descriptions of the data flow and processes in the Unclassified System.

      d.   Section IV provides descriptions of the data flow and processes for the Classified System data acquisition and archive functions.

      e.   Section V provides descriptions of the pipeline processes.

SECTION I

SYSTEM OVERVIEW

4-3.   GENERAL.

4-4.   The US NDC collects and analyzes geophysical data to monitor international compliance with the Comprehensive Test Ban Treaty (CTBT). The US NDC serves as a gateway between the US and the International Data Centre (IDC) for the exchange of geophysical data. Established at the Air Force Technical Applications Center (AFTAC) in Florida, the US NDC's primary function is to support the US monitoring and verification capabilities. The system supports:

      a.   Acquisition of seismic and hydroacoustic data.

      b.   Advanced seismic and hydroacoustic data processing.

      c.   Advanced seismic analysis techniques.

d.   Forwarding of seismic and hydroacoustic data to the IDC and other users.

e.   Staged archival of data including permanent storage.

4-5.   The US NDC provides the capability to manage raw waveform data allowing the data to be analyzed using well-defined geophysical algorithms. These algorithms accomplish the detection and identification of man-made seismic events (i.e., nuclear detonations) among the thousands of natural and non-nuclear artificial seismic events observed yearly.

4-6.   A top-level view of the system is shown in figure 4-1. The diagram shows the relationship between US NDC, its data sources, and its data recipients. The US NDC consists of an Unclassified System and a Classified System. The Unclassified System consists of the Unclassified Archive Subsystem and the Data Acquisition Subsystem. The Classified System consists of the Analysis Subsystem, the Classified Archive Subsystem, and the Analyst/Evaluator Subsystem. All internal and external communications are handled by the Unclassified and Classified Network Subsystems (not shown).

4-7.   The US NDC is the repository of a large amount of data. The system is supported by a hierarchy of high volume, non-volatile storage devices for the raw waveforms. Access to the waveforms and other generated data is supported by a Relational Database Management System (RDBMS).

4-8.   UNCLASSIFIED SYSTEM.

4-9.   The Unclassified System supports the acquisition and archival of digital seismic data from unclassified sources. After acquisition and before archiving, data is forwarded to the Classified System for processing and archiving of the processed data. The Unclassified System also supports the transmittal of unclassified data received from the AFTAC networks to the IDC as well as other customers. The Unclassified Archive Subsystem retains received data for 180 days, at which time the waveform data is recorded on tape and archived.

4-10.   The Unclassified System receives input from multiple data sources. See figure 4-1. The AFTAC Distributed Subsurface Network (ADSN) maintains the direct connections to the US Atomic Energy Detection System (USAEDS) field sites and exercises remote control over those sites where applicable.

4-11.   Data arrives in one of two forms: alpha format and non-alpha format. Alpha format data takes one data path, whereas non-alpha data takes another path. The data paths are shown in figure 4-2. Network connections are not shown, since all entities in the diagram are on the same network.

4-12.   The Diskloop Server performs all unclassified data acquisition functions including reformatting non-alpha data. The diskloop server contains the diskloops which are an efficient method of receiving data which arrives in non-uniformly-sized packets at irregular times. When data is received and complete (or is known to be incomplete for a time period),

it is sent to the external recipients via remote socket connections and forwarded to the Classified System. The Unclassified Archive Server (uarch) performs the unclassified waveform and database archive functions.
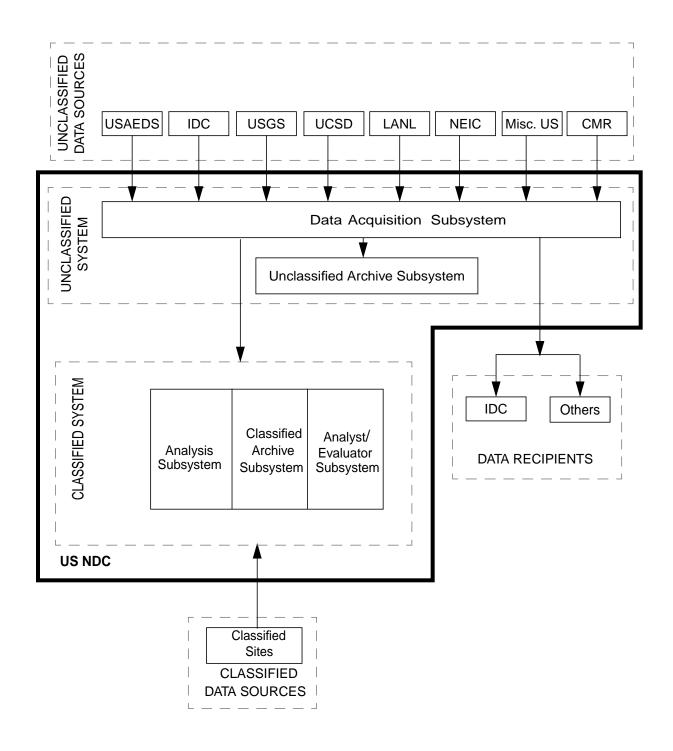
Figure 4-1. US NDC System Overview
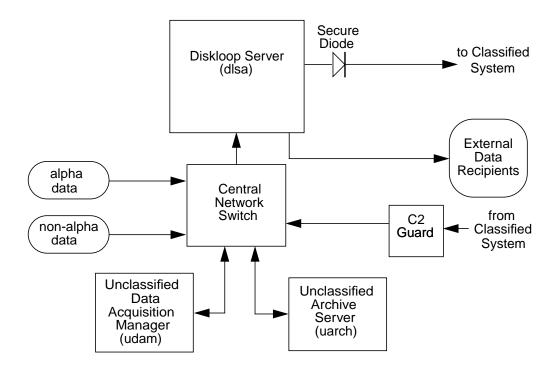
Figure 4-2. Unclassified System

4-13.   Data transfer from the Unclassified System to the Classified System is accomplished by a Secure Diode link. The Secure Diode link provides a one-way secure data path from the Unclassified System to the Classified System.

4-14.   The Unclassified Data Acquisition Manager (DAM) Station (udam) provides the capability to monitor and control the status of the real-time acquisition and archiving of waveform data.

4-15.   CLASSIFIED SYSTEM.

4-16.   The Classified System supports the following functions:

        a.   Data acquisition from the Unclassified System.

        b.   Data acquisition from classified sources.

        c.   Operation of the processing pipelines: Look-Forward, Global, Hydroacoustic, Broad Area Regional Monitoring (BARM), and Spotlight.

        d.   Seismic analysis.

e.   Evaluation analysis.

f.   Bulletin and report production.

g.   Performance monitoring.

h.   Data management.

i.   Data archiving.

4-17.   The Classified System operates on a local area network (LAN) isolated from the Unclassified System network except for communication paths provided by the Secure Diode link (refer to paragraph 4-13) and the Command and Control (C2) Guard, which enables secure file transfer to the Unclassified Network.

4-18.   The Classified System hardware, exclusive of the network hardware, is functionally divided into the Analysis Subsystem, Classified Archive Subsystem, and the Analyst/ Evaluator Subsystem. A simplified block diagram of the Classified System hardware is shown in figure 4-3. The figure shows the association of the data processing elements with the other components of the system. Figure 4-3 omits most of the network-related hardware, including the hubs for various subnetworks, the console switches, and the hardware associated with the unclassified and classified C2 Guard interface. The following paragraphs provide brief descriptions of the primary hardware elements. A more detailed description of the hardware with all connections is given in section II of this chapter.

4-19.   The Waveform Server (wfsa) receives data input and stores the data for immediate access by the Pipeline Processors and Analyst/Evaluator Stations. See figure 4-3.

4-20.   The Pipeline Processors provide distributed processing for signal detection, feature extraction, automatic event building, and preparation of data for analyst use. Pipeline processed data is stored in the Pipeline Database Server (cdbsa).

4-21.   The Classified Archive/DB Server (carch) manages the staged archiving of data obtained from the Pipeline Processors. See figure 4-3.

4-22.   The Analyst and Evaluator Stations are divided into two groups of six machines each residing on separate subnetworks. The Analyst Stations provide the operator with the interface required to perform seismic event analysis, and the Evaluator Stations host the interface for event evaluation analysis.

4-23.   The Classified Data Acquisition Manager (DAM) Station (cdam) provides monitoring and control of the data received from the Unclassified System to the Classified System to ensure the continuous acquisition and processing of the data.

4-24.   The System Operations Manager (SOM) Station (som1) controls the Classified System operations associated with processing and preservation of data associated with the pipeline processing.
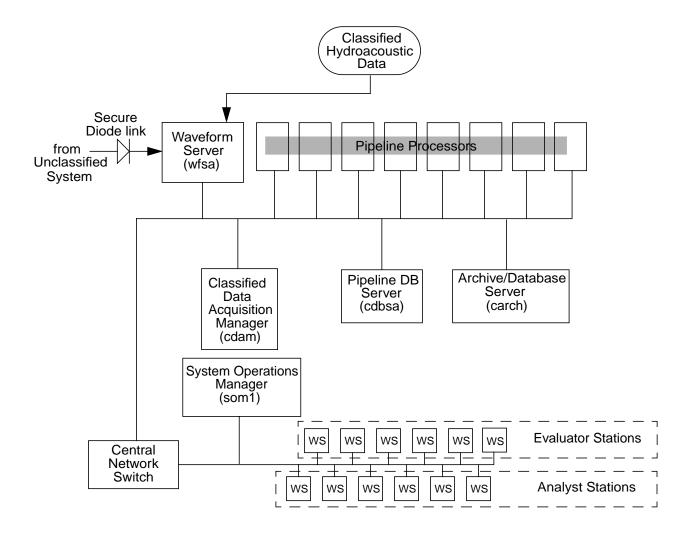
Figure 4-3. Classified System

4-25.   PIPELINE PROCESSING.

4-26.   Raw waveform data is processed to extract signal information. A number of different goals for processing are established. These goals each lead to processing schemes called pipelines. A pipeline is a sequence of processes for a defined input data set. Human analyst intervention occurs at three stages in the processing, which dictates the form of additional automatic processing stages. The pipelines and processing goals, including the type of coverage are listed in table 4-1.

4-27.   Each pipeline performs a specific set of processes directed to the goal of the pipeline. Scheduling of the processing, in most cases, is initiated based on the availability of data. Completeness is important, but the system waits only a limited time for missing data. Data which arrives too late for a processing stage is subjected to preliminary processing and inserted into a later processing stage as feasible. Of the pipelines listed in table 4-1, the Global Teleseismic Pipeline is the most complex and extensive.

Table 4-1. Pipelines

PIPELINE	GOAL	COVERAGE
Global Teleseismic	Global	Worldwide
BARM	Regional	Broad Regional Area
Spotlight	Local, Regional	Selected local areas, small events
Hydroacoustic	Oceanic	Large marine events
Look-Forward	Special Interest	Targeted areas

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4-8

FUNCTIONAL DESCRIPTION

4-28.   GENERAL.

4-29.   As described in chapter 1 and shown in figure 4-4, the US NDC is functionally divided into two major systems and a number of subsystems. Section II provides a functional description of the hardware components within each subsystem. Detailed descriptions of the application software and process data flow as related to the overall system are contained in sections III, IV, and V of this chapter.

4-30.   The Network Subsystems form the backbone for all communications and data transfer among the other subsystems. The relationships of the subsystems is depicted in figure 4-4 and outlined in the following paragraphs:

    a.   The Data Acquisition Subsystem performs the function of acquiring data from remote sites and the IDC and forwards data to the IDC, other organizations, and the Classified System.

    b.   The Unclassified Archive Subsystem stores all raw data acquired by the Data Acquisition Subsystem as well as IDC bulletin data for 180 days, and makes such data available to researchers.

    c.   The Analysis Subsystem accepts raw data from the Data Acquisition Subsystem and from classified hydroacoustic stations, and automatically performs a variety of seismic and hydroacoustic procedures on the raw data.

    d.   The Analyst/Evaluator Subsystem allows seismic analysts and evaluators to further refine the results of the automated processing and produce additional results and bulletins.

    e.   The Classified Archive Subsystem saves the results of both the automated and interactive analysis, as well as the raw data.

    f.   All subsystems are physically interconnected through a combination of high-capacity, fast ethernet LAN switches.
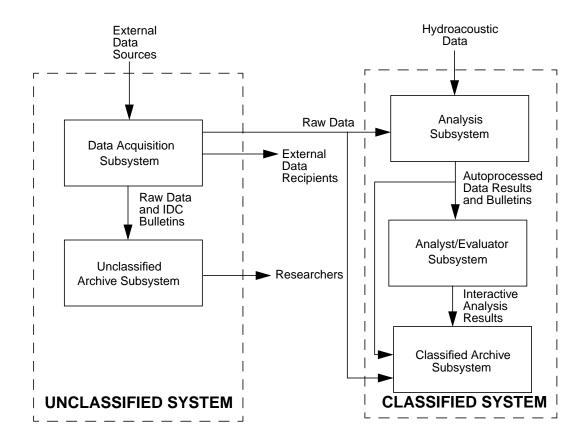
Figure 4-4. Subsystem Interrelationships

4-31.   UNCLASSIFIED AND CLASSIFIED NETWORK SUBSYSTEMS.

4-32.   The Unclassified and Classified Network Subsystems provide all data communications between the other subsystems and all data communications interfaces between the US NDC and external systems and networks. See figure 4-5. They also incorporate the station positions used for performing overall system, network, and database administration functions for the US NDC. Finally, the Network Subsystems incorporate the interfaces between the Unclassified and Classified Systems. All data communications over the network use Transmission Control Protocol/Internet Protocol (TCP/IP). All other communications protocols used, such as the alpha protocol, are layered on top of TCP/IP.
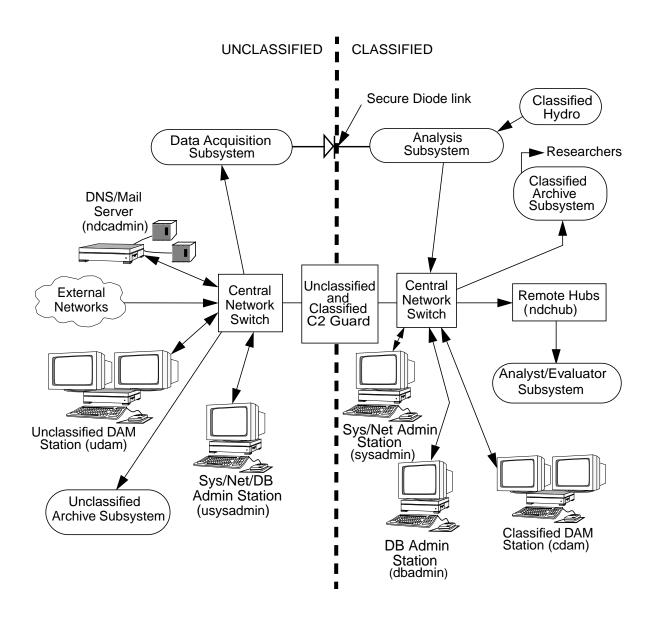
Figure 4-5. Unclassified and Classified Network Subsystems

4-33.   UNCLASSIFIED AND CLASSIFIED CENTRAL NETWORK SWITCHES.

4-34.   Inter-subsystem communications are provided by the combination of the Central Network Switches, Remote Hubs, and ethernet connections. The Unclassified and Classified Central Network switches interconnect all the US NDC equipment and have the capability to segregate groups of ports into virtual local area networks (VLANs). When VLANs are established, the switch prevents direct transmission of ethernet packets from any port of one VLAN to any port of another VLAN. Each VLAN functions as a physically isolated

ethernet segment. Any flow of information from one VLAN to another must be accomplished by an external routing device.

4-35.   The data communications interface to unclassified external systems is provided by a combination of an external router and the AFTAC firewall. The external router provides data circuit links to all the external networks from which the US NDC either receives raw data or forwards raw data. The external router is connected to the AFTAC network firewall. This provides a security barrier between the US NDC and any potentially hostile force trying to gain access by way of the external data circuits.

4-36.   REMOTE HUBS.

4-37.   The remote hubs connect the Analyst/Evaluator Stations to the Central Network Switch on the Classified System.

4-38.   SYS/NET/DB ADMIN AND DB ADMIN STATIONS (usysadmin, sysadmin, dbadmin).

4-39.   The Sys/Net/DB Admin Station (usysadmin) provides the resources to perform the system, network, and database administration duties on the Unclassified System. The Classified System uses two stations to perform the administration duties: a Sys/Net Admin Station (sysadmin) and a DB Admin Station (dbadmin).

4-40.   DNS/MAIL SERVER (ndcadmin).

4-41.   The DNS/Mail Server (ndcadmin) provides domain look-up service and IP address definition on input and queries from data sites and also performs mail forwarding services. Additionally, it holds the user account home directories and is the master Network Information Services (NIS) Server for the Unclassified System.

4-42.   SECURE DIODE LINK.

4-43.   The Secure Diode link provides continuous one-way transmission of information from the Unclassified System to the Classified System. It uses an optical fiber link in which the transmit port on the unclassified side is connected to the receive port on the classified side, but no connection is made in the reverse direction. Consequently, it is physically impossible to transmit data from classified to unclassified.

4-44.   C2 GUARD.

4-45.   The C2 Guard consists of three computers: Unclassified Interface (lqmgr), Classified Interface (hqmgr), and XTS300 Controller. The C2 Guard is an accredited secure file transfer system for bi-directional transmission of files between the Classified Network Subsystem and the Unclassified Network Subsystem. It uses restricted file formats and content analysis techniques, such as keyword filtering, to ensure that classified information is not transmitted to the unclassified segment.

4-46.   UNCLASSIFIED AND CLASSIFIED DATA ACQUISITION MANAGER STATIONS (udam, cdam).

4-47.   The DAM stations (udam on the unclassified side and cdam on the classified side) provide the capability to monitor and control the status of the real-time acquisition and archiving of waveform data from the ADSN USAEDS stations, ASN stations, and the IDC. The operation of udam and cdam is identical. Using the WorkFlow graphical user interface (GUI), the DAM operator can verify normal operations as well as detect reduced capabilities due to abnormal conditions, such as interruptions in external communications. By using the Launch GUI, the DAM operator can selectively start and stop individual data acquisition processes on specific processors, therefore effecting total control over receiving, forwarding, and archiving functions.

4-48.   DATA ACQUISITION SUBSYSTEM.

4-49.   The Data Acquisition Subsystem acquires data and forwards data to the external data recipients and to the Classified System. See figure 4-6. The Data Acquisition Subsystem consists of the Diskloop Server (dlsa) and one Console Switch.

4-50.   DISKLOOP SERVER (dlsa).

4-51.   The function of the Diskloop Server (dlsa) is the acquisition, conversion, and forwarding of seismic and hydroacoustic waveforms accepted from authorized unclassified sites. This capability is described in paragraph 4-112 which also describes data forwarding to the Classified System.
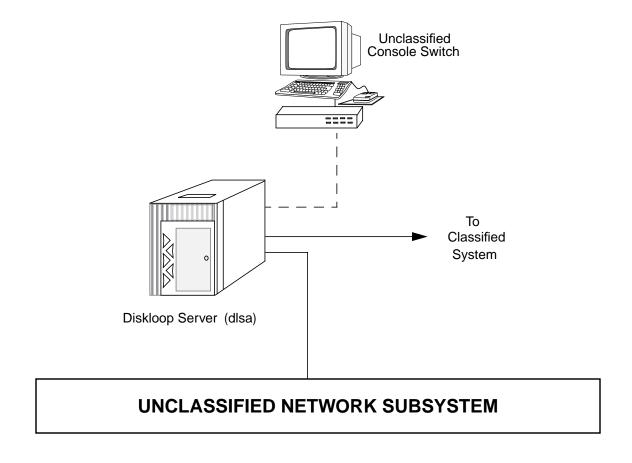
Figure 4-6. Data Acquisition Subsystem

4-52.   UNCLASSIFIED CONSOLE SWITCH.

4-53.   The Console Switch provides the means to allow a single monitor and keyboard to be connected to multiple processors on the same system. Selection of the active port can be changed at any time by a keyboard command. Operation of the console port does not interrupt proper functioning of the associated processor.

4-54.   UNCLASSIFIED ARCHIVE SUBSYSTEM.

4-55.   The Unclassified Archive Subsystem (figure 4-7) provides long-term and permanent storage of data received by the Data Acquisition Subsystem. The Unclassified Archive Subsystem consists of the Unclassified Archive/Database Server (uarch) and a DLT tape library.
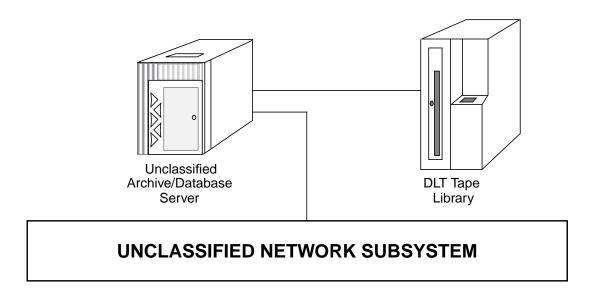
Figure 4-7. Unclassified Archive Subsystem

4-56.   UNCLASSIFIED ARCHIVE/DATABASE SERVER (uarch).

4-57.   Raw waveforms are stored in the file system of this machine for a period of five days. After five days, waveforms are transferred to the digital linear tape (DLT) robot storage for 180 days.

4-58.   The Unclassified Archive/DB Server (uarch) holds a single database instance (ie., uarch) identified as uarch which stores the waveform descriptor records (wfdisc) for all waveforms stored in the unclassified archive and the IDC bulletins.

4-59.   ANALYSIS SUBSYSTEM.

4-60.   The Analysis Subsystem (figure 4-8) hosts the classified data acquisition and automatic processing functions. The Analysis Subsystem consists of one Waveform Server (wfsa), one Pipeline DB Server (cdbsa), eight Pipeline Processors (pipe1a - pipe8a), and one Classified Console Switch.
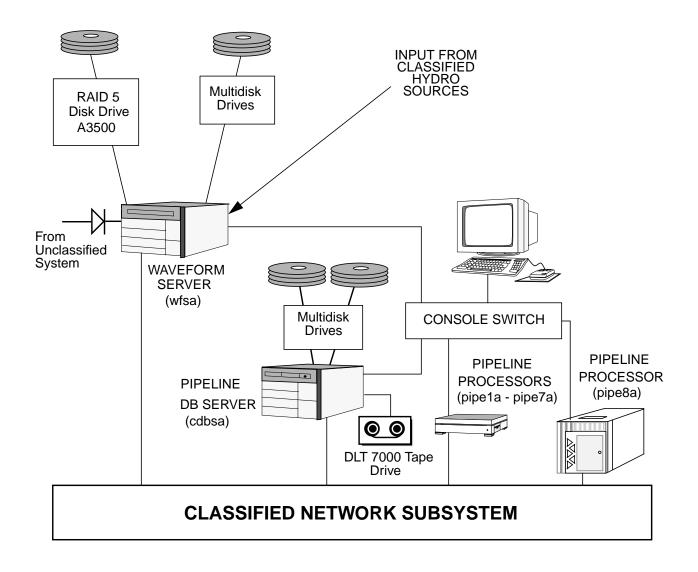
Figure 4-8. Analysis Subsystem

4-61.   WAVEFORM SERVER (wfsa).

4-62.   The Waveform Server (wfsa) has the connection to the receiving side of the secure diode. It performs acquisition of interval data from the Unclassified System, and acquisition and storage of waveform data from the Unclassified System as well as from the Classified Hydro sites.

4-63.   In addition to its data acquisition function, wfsa includes a disk array storage capacity of 2184 GBbytes and serves as the source for all waveforms selected for analysis and evaluation at the Analyst/Evaluator Stations. It provides storage for 45 days of raw and derived waveforms and serves as the source for the classified archiving process.

Additionally, it holds the user account home directories and is the master NIS Server for the Classified System.

4-64.   PIPELINE DATABASE SERVER (cdbsa).

4-65.   The Pipeline DB Server (cdbsa) is the repository of the wfdisc table which catalogs all waveforms, regardless of type, that have been received and are resident on the waveform server. In addition, it is the repository and temporary storage area for all final and intermediate alphanumeric data generated by the analysis and evaluation activities.

4-66.   The Pipeline DB Server (cdbsa) hosts the instance of a database which contains the diskloop waveform catalog (wfdisc table) and all the derived analysis products (commonly referred to as alphanumeric data). A DLT tape drive provides data backups and restoration capability.

4-67.   PIPELINE PROCESSORS (pipe1a - pipe8a).

4-68.   The eight Pipeline Processors (pipe1a - pipe8a) provide the capability for analysts and evaluators to run the geophysical algorithms on waveform data stored on the Waveform Server (wfsa). These algorithms are exercised either under program control or by selection at the Analyst/Evaluator Station.

4-69.   CLASSIFIED CONSOLE SWITCH.

4-70.   Each processor in the Analysis Subsystem is connected to a Classified Console Switch and console monitor in the same manner as described for the Unclassified Data Acquisition Subsystem.

4-71.   CLASSIFIED ARCHIVE SUBSYSTEM.

4-72.   The Classified Archive/Database Subsystem (figure 4-9) includes the Classified Archive/Database Server (carch).

4-73.   CLASSIFIED ARCHIVE/DATABASE SERVER (carch).

4-74.   The Classified Archive/Database Server (carch) is the classified data archive and associated database. Raw waveforms are stored in the file system of this machine for a period of approximately 30-45 days. At any given time, the archiving processes access the Waveform Server (wfsa). This function is described more completely in paragraph 4-159.
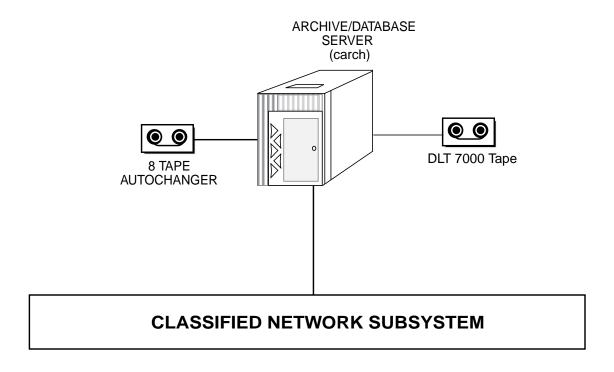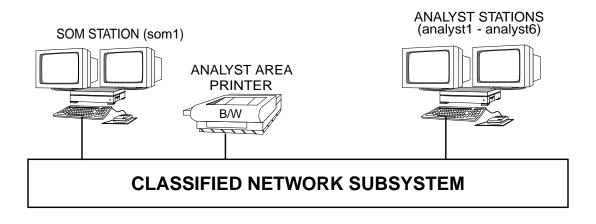
Figure 4-9. Classified Archive Subsystem

4-75.   The Classified Archive/Database Server (carch) also hosts an Oracle database instance which holds the waveform descriptor records (wfdisc) for all waveforms stored in the classified archive. The classified archive database also holds copies of all the alphanumeric data produced by automated/interactive processing over the lifetime of the US NDC. As waveforms are migrated from short-term to permanent archive, a staging area temporarily stores the data. This area is also used to download waveform data from the DLT to the US NDC Classified System.

4-76.   ANALYST/EVALUATOR SUBSYSTEM.

4-77.   The Analyst/Evaluator Subsystem (figure 4-10) provides the interactive processing function. It consists of identically configured stations in dual monitor configuration with one station serving as the System Operations Manager (SOM).

4-78.   ANALYST AND EVALUATOR STATIONS (analyst1 - analyst6 AND eval1-eval6).

4-79.   The Analyst Stations (analyst1 - analyst6) and Evaluator Stations (eval1 - eval6) provide operational personnel with the ability to exercise and control the seismic processing of stored waveforms. The process is accomplished at the station.

4-80.   SOM STATION (som1).

4-81.   The SOM Station is provided for the implementation and exercise of seismic operations management activities on the Classified System.
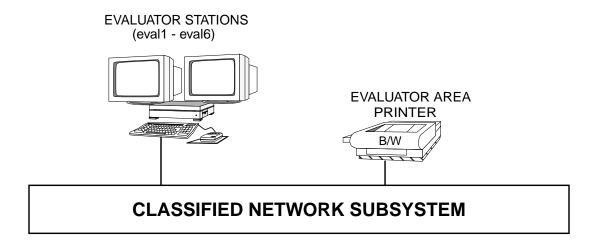
Figure 4-10. Analyst/Evaluator Subsystem

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SECTION III

UNCLASSIFIED SYSTEM PROCESSES AND DATA FLOW

4-82. GENERAL.

4-83. The Unclassified System performs the following three principal functions:

a. Data Acquisition

b. Data Forwarding

c. Data Archiving

4-84. DATA ACQUISITION.

4-85. The data acquisition function consists of external connection management, data conversion, interval processing and diskloop management subfunctions. The following paragraphs describe each of these subfunctions.

4-86. INTERNAL CONNECTION MANAGEMENT.

4-87. The unclassified gap handling component attempts to fill data gaps automatically. It obtains outage reports from the Unclassified C2 Guard, attempts to reconcile missing data, and puts missing data that has been found from the UDAS onto gap heap files for the Unclassified Data Forwarding component.

4-88. EXTERNAL CONNECTION MANAGEMENT.

4-89. The management of the connections to external data sources is a major subfunction. The Unclassified System uses a variety of connection management methods for external data sources. Connection management, as discussed in this section, is relevant only to sites supplying inbound data. Connections to the Unclassified System are discussed in the following paragraphs.

4-90. DATA SOURCES (INPUTS). The data coming into the US NDC appear in the four following data formats:

a. Alpha

b. Center for Seismic Studies (CSS)

c. Data Transaction Center (DTC)

d. SUDS

4-91.   Conversion routines are necessary to modify the inputs to a common internal format. Once converted, the data, as well as the original data from the alpha sites, is processed by the assigned Diskloop Manager (DLMan) process.

4-92.   CSS and DTC formats require conversion. The conversion programs are file2Alpha and dtc2alpha, respectively. There are one or more instances of each of these programs running on the Diskloop Server (dlsa). The failure of either of these programs will cause cessation of the CSS or DTC data streams, as applicable, to that processor.

4-93.   DATA DESTINATIONS (OUTPUTS). Data received by the US NDC is subsequently forwarded to a number of authorized customers. Data is forwarded on a station-by-station basis to the IDC and the Center for Monitoring Research (CMR). Data is forwarded to the US NDC Sustainment System. This system is used for software development. The data is forwarded in alpha format. In addition to providing data to the external entities, data is transferred in alpha format to the Classified System through a Secure Diode link.

4-94.   CONNECTIONS TO ALPHA SITES. Connections to alpha sites are all handled identically. The sockd program, running on Diskloop Server (dlsa), waits for connection requests from any external site across the network. Once a request is received, sockd spawns a copy of the ConnMan program to handle the request. ConnMan validates the request, rejecting any from unauthorized sites, and responds to the originating system. This response contains the IP address of the diskloop server and the port number of the DLMan program instance that will accept the data. Once completed, ConnMan terminates. This interaction is illustrated in figure 4-11. The numbers appended to the data flows indicate processing sequence.

4-95.   CONNECTIONS TO ASN SITES (VIA ADSN). Connections to the ASN sites through the ADSN are made via the putfiled program which executes on the US NDC Diskloop Server (dlsa). The US NDC putfiled program waits for network transactions from the putfile program executing on the ADSN machine amazon. Upon receipt of a transaction from ADSN, the US NDC putfiled writes the transaction to a file on Diskloop Server (dlsa).

4-96.   CONNECTIONS TO USAEDS SITES (VIA ADSN). Descriptions of the connections to the USAEDS stations (via ADSN) are provided in the following:

  a.   Realtime Data - The connections to the USAEDS stations are made through the ADSN machine dcol3. A program running on dcol3, called DFS, receives a connection from dtc2alpha programs running on the Diskloop Server (dlsa). Waveform data is sent in DTC format, converted to alpha, and put in heap files by dtc2alpha.

  b.   Gapped Data - Gaps in the USAEDS data are pulled into the NDC in CSS 3.0 format. The data is collected from dcol3 as well as directly from the field sites. After the data is gathered, the file2alpha process converts the data and puts it in heap files on the Diskloop Server (dlsa).

4-97.   CONNECTION TO LANL. The connection to Los Alamos National Laboratory (LANL) is a variation of a push model. A processor at LANL Network File System (NFS) mounts a directory/file system on the US NDC machine Diskloop Server (dlsa) and writes (i.e., pushes) waveform data to it. As long as the network is up and Diskloop Server (dlsa) is running (functional), the passive connection to LANL is up.
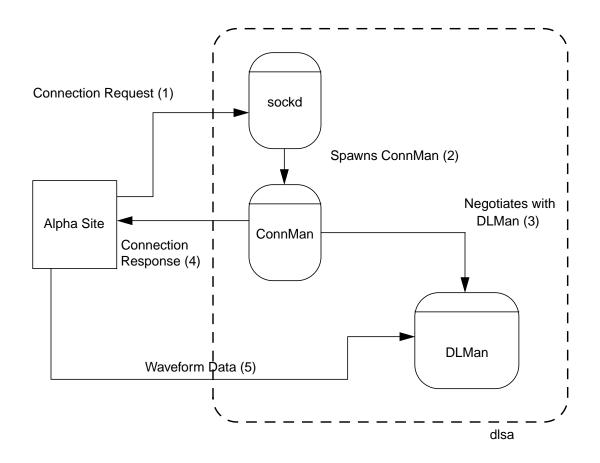
Figure 4-11. Alpha Site Connections to US NDC

4-98.   DATA CONVERSION.

4-99.   Data entering the Unclassified System arrives in one of the following four formats:

    a.   Alpha

    b.   SUDS

    c.   CSS

    d.   DTC

4-100.   Data received in alpha-format does not require conversion; however, the data from ASN, USAEDS, and LANL is not in alpha-format and must undergo a conversion.

4-101.   ASN SITES AND LANL. The ASN stations and LANL will be discussed together since their entrance to the US NDC is similar. Both interfaces are to the Diskloop Server (dlsa). See figure 4-12.
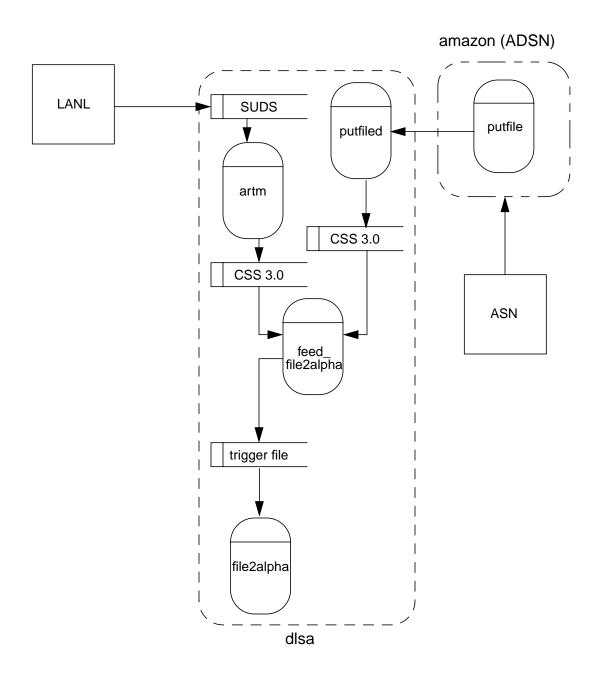
Figure 4-12. LANL and ASN Data Acquisition

4-102.   The LANL NFS writes SUDS format waveform files to Diskloop Server (dlsa). The SUDS format files are processed by a program called artm, which converts the waveforms to CSS 3.0 format and places the output in local files for further processing.

4-103.   The ASN data comes through the ADSN machine amazon. A process called putfile opens a socket connection to a US NDC process called putfiled running on Diskloop Server (dlsa). CSS-3.0 compliant files are sent to the US NDC and written to local files by putfiled.

4-104.   Local CSS 3.0 files are subsequently processed by a program called feed_file2alpha running on Diskloop Server (dlsa). The output of this process is a trigger file, which is accessed by the file2alpha processes running on the Diskloop Server (dlsa). A trigger file contains a list of files to be processed. This process is illustrated in figure 4-12.

4-105.   USAEDS SITES. Descriptions of the USAEDS sites are provided in the following:

        a.   Realtime Data - The USAEDS sites provide data in DTC format to the US NDC through the ADSN system. The DFS process accepts a TCP/IP socket connection and sends DTC-formatted transactions to the dtc2alpha process running on the diskloops of the Diskloop Server (dlsa). The dtc2alpha process converts the DTC-formatted data into alpha data and places it into heap files for subsequent processing by the AlphaForward process, which is responsible for inbound data interfaces.

        b.   Gapped Data - Gaps in the USAEDS data are filled by pulling CSS 3.0-formatted data from dcol3 and the field sites. This data is pulled to the US NDC using a process called LateData. The data collected by the LateData process is passed to file2alpha which converts the data into Alpha format and stores the data in heap files for access by AlphaForward.

4-106.   INTERVAL PROCESSING.

4-107.   In addition to the data interface to the Classified System described in paragraph 4-93, the Unclassified System forwards interval information to the Classified System for display in the classified Data Acquisition WorkFlow. Interval information is generated by processes running on the Diskloop Server (dlsa), then forwarded to the Classified System. Interval processing is illustrated in figure 4-13. Interval processing consists of four programs (update_interval, send_interval, file_send and diode_send) running on the Diskloop Server (dlsa).

4-108.   The update_interval process generates interval information for the unclassified Data Acquisition WorkFlow. The send_interval process places the interval information in ASCII files every 60 seconds and makes them available to file_send for transfer to the Classified System. The file_send process looks every 60 seconds for files to send to diode_send for transmission across the diode to rt_reader (on Waveform Server (wfsa)) in the Classified System.
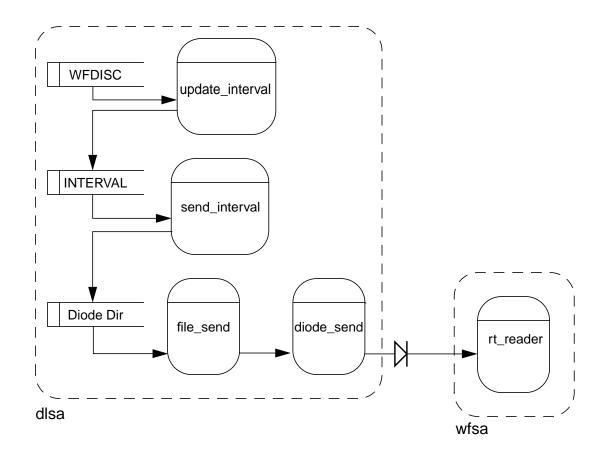
Figure 4-13. Interval Processing

4-109. DISKLOOP MANAGER.

4-110. DLMan has the principal function of accepting alpha waveform data from sites which have negotiated a connection through a US NDC ConnMan instance. DLMan is started by the operator at system start-up and runs indefinitely. There are three instances of the DLMan program running simultaneously on the Diskloop Server (dlsa). See figure 4-14.

4-111. Once started, DLMan reads its `.par` file which defines the ports on which to send and receive data. After the initialization sequence is complete, DLMan updates the DLMan table in the database to register its existence and waits for data packets pushed from alpha sites. When received, and having verified the data comes from a legitimate source by accessing the ALPHASITE table in the database, DLMan stores the waveforms in the appropriate diskloop file and updates the wfdisc table in the database.

From External Alpha Sites
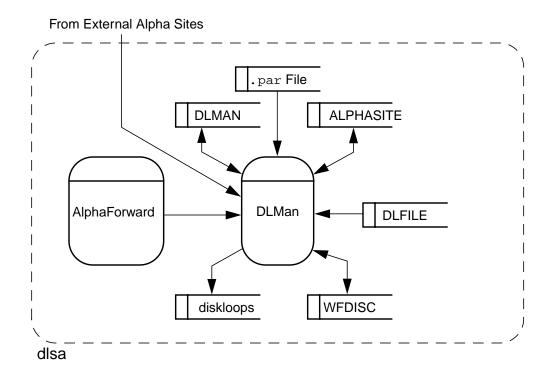
Figure 4-14. The DLMan Acquisition Program

4-112.   DATA FORWARDING.

4-113.   DESTINATIONS.

4-114.   IDC AND CMR. The IDC and CMR serve as both a source and destination of seismic waveforms. The data interface is strictly compliant with the alpha protocol in both directions. Forwarding to the IDC from the AlphaForward process running on each of the Diskloop Server (dlsa) is shown in figure 4-15.

4-115.   CLASSIFIED SYSTEM. The Classified System is the analytical and evaluation facility of the US NDC. Data received by the Unclassified System is forwarded, unmodified except for format, to the Classified System. The transfer is exclusively one-way.

4-116.   ANCILLARY DATA CUSTOMERS. The US NDC has three external customers for data acquired by the Unclassified System: SMU, SNL, and IRIS. At AFTAC, there are three machines which function as the interface. Although US NDC-developed software is resident on these machines and supports the data transfer to the stated destinations, these machines and software are considered external to the US NDC.
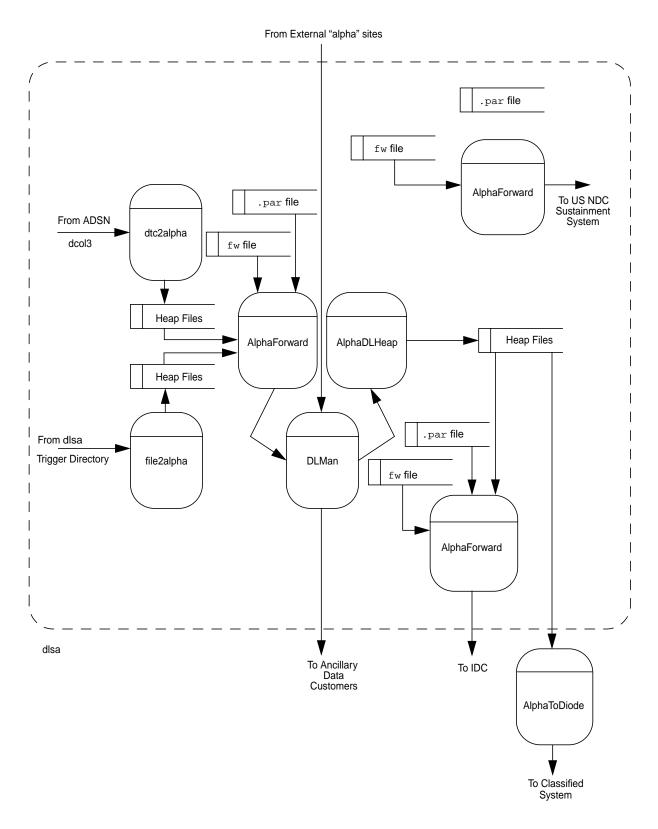
Figure 4-15. Data Forwarding

4-117.   PROCESSES.

4-118.   Data destined to be forwarded to the IDC and the Classified System is sent to a locally resident AlphaDLHeap program. If the data is destined for SNL, IRIS, or SMU, DLMan interfaces to an AlphaDLHeap program running on an external machine.

4-119.   The three programs supporting the data forwarding function are AlphaDLHeap, AlphaForward, and AlphaToDiode. There is one instance of AlphaDLHeap, one instance of AlphaToDiode, and three instances of AlphaForward residing on the Diskloop Server (dlsa). Figure 4-15 illustrates the processing environment for these programs.

4-120.   AlphaDLHeap is the process which prepares inbound alpha packets for forwarding. AlphaDLHeap is started by the operator at system start-up and is intended to run indefinitely.

4-121.   At start-up, AlphaDLHeap reads its `.par` file, reads the fwfile table, and opens a socket connection to each of the running DLMan processes. Once active, AlphaDLHeap takes packets from DLMan and writes them to a series of local heap files. There is one heap file per station per destination. For example, if there are 15 stations going to three destinations, then there are 45 individual heap files. The outbound data is replicated if it goes to more than one destination. AlphaDLHeap is intended to run indefinitely.

4-122.   AlphaForward is the process which forwards data to alpha protocol-compliant destinations. AlphaForward is started by the operator at system start-up, usually through the facilities of the Launch program, and is intended to run indefinitely. There are three types of AlphaForward running. One sends heap file data from dtc2alpha and file2alpha to the local DLMan processes. The second sends alpha data to the IDC. The third sends alpha data to the US NDC Sustainment System.

4-123.   At start-up, AlphaForward reads its local parameter file and the fwfile table. Once active, AlphaForward reads from the heap files and writes packets to the appropriate socket. There is one socket for each station/destination and AlphaForward does not open the socket connection until there is data to send for a particular station/destination. The read-write sequence for AlphaForward is round-robin style, across the heap files. In this way, all stations/destinations are treated with the same priority. The heap files are processed by AlphaForward in last-in-first-out (LIFO) order. The most recent arriving data has a higher priority for forwarding over older data already waiting in the heap files.

4-124.   At start-up, AlphaToDiode reads its local parameter file, then the fwfile table opens a TCP/IP socket connection with the diode_send program running on the Diskloop Server. Once connected, AlphaToDiode reads from the heap files written by AlphaDLHeap for the Classified System and writes packets to the socket. The read-write sequence for AlphaToDiode is the same as for AlphaForward. In other words, the data is read round-robin style, across the heap files. In this way, the data is interleaved going to diode_send. The heap files are processed by AlphaToDiode in LIFO order. The most recent arriving data has

a higher priority for forwarding over older data already waiting in the heap files. AlphaToDiode is illustrated in figure 4-16.
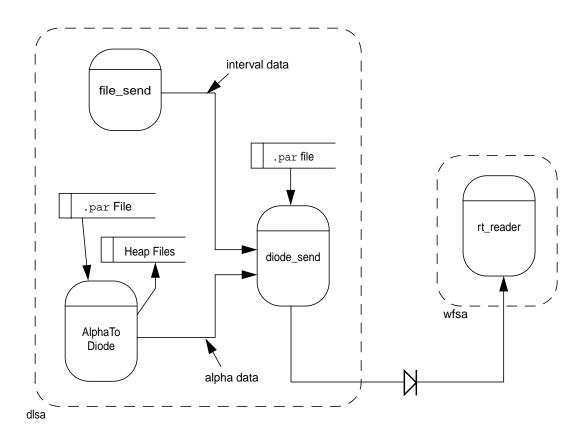
Figure 4-16. Processing Data to the Classified System

4-125. The program diode_send accepts TCP/IP socket connections from the AlphaToDiode and file_send programs. See figure 4-16. Once the connection is established, alpha packets are transmitted from these programs to diode_send.

4-126. The program diode_send is initiated by the operator at the time of system initialization and is not intended to terminate. There is a single copy of diode_send running on the Diskloop Server (dlsa).

4-127. At start-up, diode_send reads its local parameter file, opens a User Datagram Protocol/Internet Protocol (UDP/IP) socket for transmission across the Secure Diode link, and establishes which ports to listen to for incoming data. Then diode_send sends alpha packets across the Secure Diode link to an rt_reader process running on the Waveform Server in the Classified System. The UDP/IP connection is required since one-way transmission of data must be assured. The Secure Diode link obviates the use of the TCP/IP protocol since TCP/IP requires two-way communication. This is physically disallowed by the

diode and would constitute a security violation, if allowed. Upon accepting an inbound data packet, the packet is forwarded across the Secure Diode link to the Classified System.

4-128. UNCLASSIFIED ARCHIVE PROCESS.

4-129.   The Unclassified Archive Subsystem provides long-term and permanent storage of the data received by the Data Acquisition Subsystem. See figure 4-17. The Unclassified Archive Subsystem consists of an Unclassified Archive/Database Server (uarch). The Unclassified Archive Server (uarch) has two disk farms and a DLT Robot. The first disk farm is RAID (Redundant Array of Independent Disks) storage. The second disk farm is on-line storage used by SAM-FS in conjunction with the DLT Robot and will be referred to as archive storage.
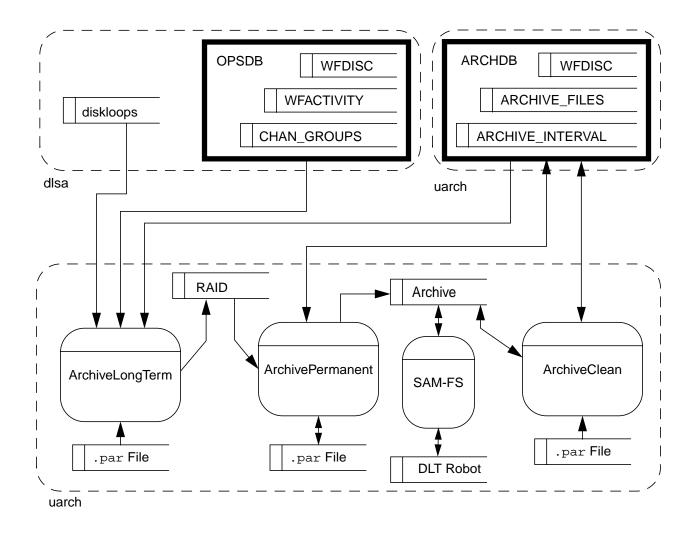
Figure 4-17. Unclassified System Data Archiving

4-130. ARCHIVELONGTERM.

4-131. The program ArchiveLongTerm is used to copy data from the diskloops to the RAID storage. Each file that ArchiveLongTerm creates in RAID storage contains two hours of compressed waveform data from all channels of a single station.

4-132. During the initialization phase, ArchiveLongTerm reads its `.par` file, establishes a connection to both the OPSDB and ARCHDB databases, and reads configuration information from the CHAN_GROUPS table. After initialization ArchiveLongTerm creates, updates, and deletes intervals in the ARCHIVE_INTERVAL table. The class of these intervals is CONTIN. Old intervals are deleted, new intervals are created, and existing intervals are updated based on information from the WFACTIVITY table. The final phase of operation is to copy waveform data to the RAID storage. Each interval represents a group of channels for a particular timeframe. The US NDC configuration has each station's channels grouped together into two-hour intervals.

4-133. ArchiveLongTerm looks for intervals which have reached a certain `.par` determined age, or are considered full (all data has been acquired) and copies the data associated with each interval to a file in the RAID storage. Each interval has a separate file associated with it. A record is created in the ARCHIVE_FILES table to connect the file to the interval record in the ARCHIVE_INTERVAL table. Table 4-2 shows all the states ArchiveLongTerm and ArchivePermanent use and the description of each state.

Table 4-2. Unclassified Archive Interval States

STATE	DESCRIPTION
empty	There is no data for this interval.
partial	There is some missing data for this interval.
full	There is no missing data for this interval.
archlong-started	ArchiveLongTerm has started to copy this data to RAID storage.
archlong-failed	ArchiveLongTerm encountered an error while trying to copy this interval to RAID storage.
archlong-done	ArchiveLongTerm successfully copied this interval to RAID storage.
emptydone	ArchiveLongTerm did not find any data to copy while working on this interval.
archperm-copy	ArchivePermanent is currently copying the file associated with this interval from RAID storage to the archive.
archperm-wait	ArchivePermanent is waiting for the files associated with this interval to be placed on DLT.

Table 4-2. Unclassified Archive Interval States (Cont)

STATE	DESCRIPTION
archperm-update	ArchivePermanent is waiting for the interval to reach a certain age (`.par` determined) before updating the wfdisc records to point to the archive file instead of the RAID file.
archperm-remove	ArchivePermanent is waiting for the interval to reach a certain age (`.par` determined) before removing the file in RAID storage.
archperm-failed	ArchivePermanent encountered an error while operating on this interval.
archperm-done	ArchivePermanent is done with this interval and it is completely archived.

4-134.   ARCHIVEPERMANENT.

4-135.   The program ArchivePermanent moves the files from RAID storage to archive storage. ArchivePermanent does this in stages, which ensures there is no possibility for data loss. During the initialization phase, ArchivePermanent reads its `.par` file and establishes a connection to the ARCHDB database. After initialization, ArchivePermanent creates and deletes intervals in the ARCHIVE_INTERVAL table. The class of these intervals is ARCHIVE. Old intervals are deleted and new intervals are created. In the last phase of operation, ArchivePermanent looks at each ARCHIVE and associated (by time) CONTIN intervals to see if they can be advanced to the next state.

4-136.   Initially, files associated with archlong-done intervals are copied from RAID storage to archive storage. Only archlong-done intervals older than a `.par` determined time will be copied. Once the intervals file is copied, its state is changed to archperm-wait.

4-137.   Every time ArchivePermanent runs, it looks at each file associated with intervals in the archperm-wait state and checks to see if the file has been placed on a DLT tape by SAM-FS. When ArchivePermanent has determined that a file is on tape, it will update the associated interval's state to archperm-update.

4-138.   When an interval in the archperm-update state reaches a `.par` determined age, the wfdisc records in the ARCHDB database associated with that interval are updated to point to the file in archive storage instead of the file in RAID storage. Once this is done, the state of the interval is changed to archperm-remove.

4-139.   When an interval in the archperm-remove state reaches a `.par` determined age, its associated file in RAID storage is removed and the associated interval record is updated to the archperm-done state. When all the CONTIN class intervals are updated to the archperm-done state, the ARCHIVE_FILES records are updated so they are associated to

the single ARCHIVE class interval. This is done so that when the CONTIN class intervals are deleted ArchiveClean can still determine what to remove.

4-140.   ARCHIVECLEAN.

4-141.   The program ArchiveClean removes old files from archive storage to maintain only the most recent 180 days of data in archive storage. Once started, ArchiveClean enters its initialization phase, reads its `.par` file, and establishes a connection to the ARCHDB database. After initialization, ArchiveClean finds ARCHIVE class intervals older than a `.par` determined age and removes the intervals, their associated ARCHIVE_FILES records, and their associated file in archive storage.

SECTION IV

CLASSIFIED ANALYSIS SYSTEM PROCESSES AND DATA FLOW

4-142. GENERAL.

4-143. The Classified System performs the following four principal functions:

    a.   Data Acquisition

    b.   Waveform Analysis (discussed in section V)

    c.   Waveform Evaluation (discussed in section V)

    d.   Waveform and Analysis Products Archiving

4-144. DATA ACQUISITION.

4-145. The process for receipt of alpha protocol data is similar to that found on the Unclassified System. Connections are requested by a ConnMan process (spawned by a sockd demon) originating from the Waveform Server (wfsa). The response to the request is the address of the DLMan process which will accept the alpha packets. The differences lie in the following:

    a.   All data acquisition processing takes place in the Waveform Server (wfsa).

    b.   There are six DLMan processes running on the Waveform Server.

4-146. DATA SOURCES.

4-147. The three distinct data inputs to the Classified System are as follows:

    a.   Unclassified Waveform Data

    b.   Interval Data

    c.   Classified Hydro Data

4-148. UNCLASSIFIED WAVEFORM DATA. Unclassified waveform data is transferred to the Classified System Waveform Server from the Unclassified System via the Secure Diode link.

4-149. INTERVAL DATA. Unclassified interval data is transferred to the Classified System from the Unclassified System via the Secure Diode link.

4-150.   CLASSIFIED HYDRO DATA. Hydro data from classified stations is received by the Classified System in the Waveform Server (wfsa). Once the connection is established, waveform data, compliant with the alpha protocol, is received. The DLMan process, running on the Waveform Server (wfsa), accepts the data forwarded by AlphaNode and processes the data into the Classified Data Acquisition Subsystem. Figure 4-18 illustrates this data interface.

Hydroacoustic Waveform Data

AlphaNode

DLMan
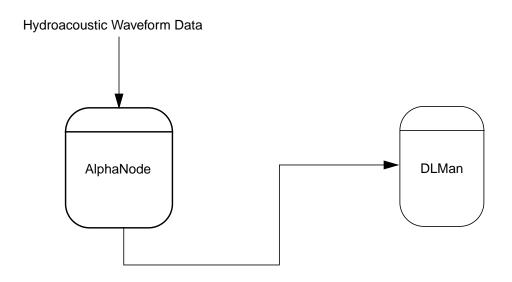
Figure 4-18. Classified Hydro Data Interface through AlphaNode

4-151.   DATA DESTINATIONS.

4-152.   For security reasons, no waveform or data products are output from the Classified System. The only output allowed is a Group of Scientific Experts (GSE) 2.0-formatted email message which is sent from the Classified System to the Unclassified System. This minimal interface, used to support gap handling, is effected across the Classified C2 Guard. The C2 Guard is an accredited system for transferring alphanumeric text files from a high security to a low security system.

4-153.   The classified gap handling component attempts to fill data gaps automatically. It reads data frame logs from the Classified Data Acquisition Subsystem component or receives manual requests from the DAM, attempts to determine if there is missing data, and provides an outage report that is then transferred to the C2 Guard.

4-154.   DATA TRANSFER.

4-155.   Within the data acquisition processing, UDP/IP packets are sent across the Secure Diode link to the rt_reader program which places them into a shared memory buffer. These

special format packets are then read from shared memory by diode_recv and re-assembled into diode protocol packets. The diode protocol packets are then fed by diode_recv to its two clients: DiodeToAlpha and file_recv. The program DiodeToAlpha performs the conversion from the diode protocol to alpha protocol and places the alpha protocol packets into an appropriate heap file. The file_recv program converts diode packets into files, one file per packet. This interface is illustrated in figure 4-19.
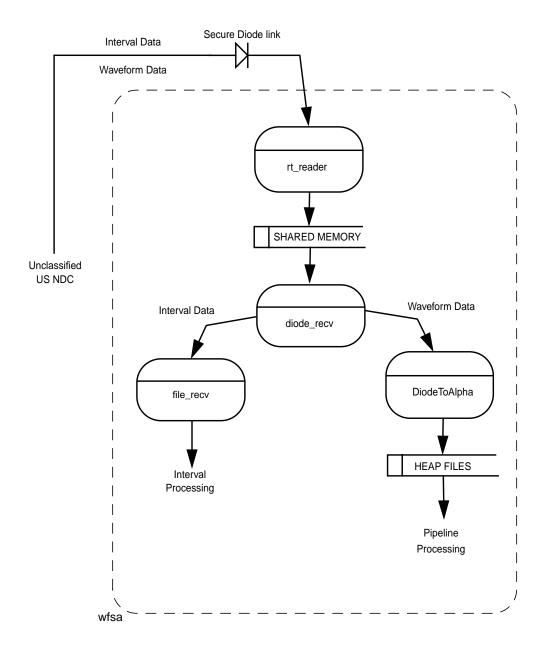
Figure 4-19. Unclassified to Classified Data Transfer

4-156. INTERVAL PROCESSING.

4-157. Interval information is generated on the Unclassified System and transferred to the Classified System. Once in the Classified System this interval information is made available for display by the classified data acquisition WorkFlow.

4-158. When the interval information is sent to the Classified System by the Unclassified System, it is received by the file_recv process (refer to paragraph 4-154 for more details) and placed into ASCII files. The recv_interval program reads these ASCII files and makes the appropriate updates to the INTERVAL table in the database on the Pipeline DB Server. The update_interval process checks the database and determines the station's timeframe from the data, and updates the interval table corresponding to the original station data. The classified data acquisition WorkFlow GUI displays this interval information from the INTERVAL table along with the interval information generated by the update_interval process. This entire process is illustrated in figure 4-20.
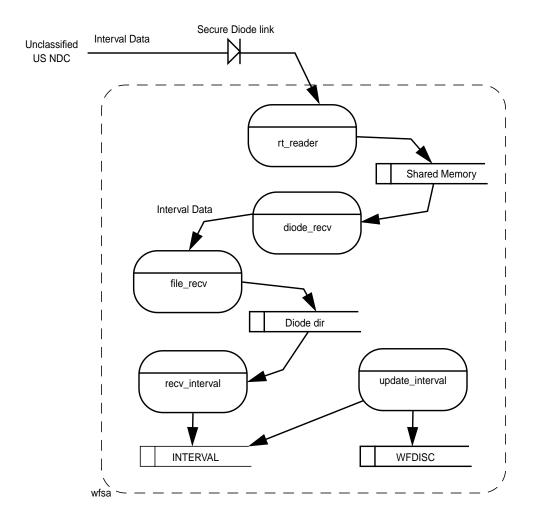
Figure 4-20. Interval Data Processing

4-159. CLASSIFIED ARCHIVE PROCESS.

4-160.   The Classified Archive Subsystem provides long-term and permanent storage of the data received by the Analysis Subsystem. The Classified Archive Subsystem (figure 4-21) consists of a Classified Archive/Database Server (carch). The Archive/DB Server (carch) has two disk farms and a DLT 8-tape autochanger. The first disk farm is RAID storage. The second disk farm is on-line storage used by SAM-FS in conjunction with the DLT 8-tape autochanger and will be referred to as archive storage.
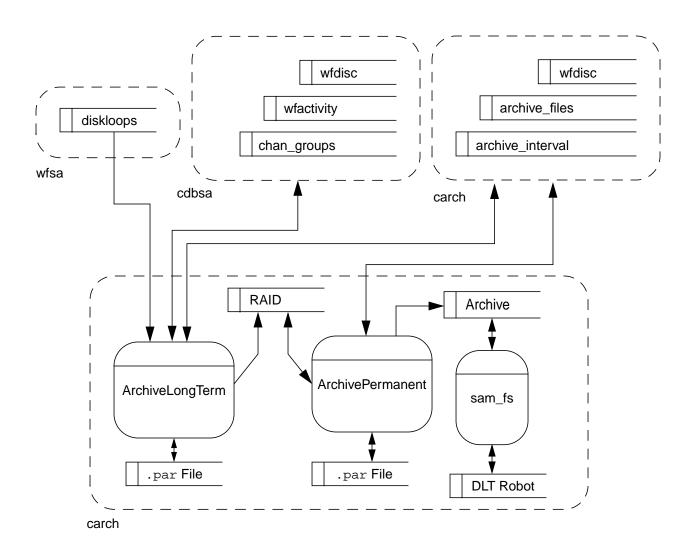
Figure 4-21. Classified System Data Archiving

4-161.   ARCHIVELONGTERM.

4-162.   The program ArchiveLongTerm is used to copy data from the diskloops to the RAID storage. Each file ArchiveLongTerm creates in RAID storage contains two hours of compressed waveform data from all channels of a single station.

4-163.   During the initialization phase, ArchiveLongTerm reads its `.par` file, establishes a connection to both the OPSDB and ARCHDB databases, and reads configuration information from the CHAN_GROUPS table. After initialization, ArchiveLongTerm creates, updates, and deletes intervals in the ARCHIVE_INTERVAL table. The class of these intervals are CONTIN, SEGMENT and BEAM. Old intervals are deleted, new intervals are created, and existing intervals are updated based on information from the WFACTIVITY table. The final phase of operation is to copy waveform data to the RAID storage. Each interval represents a group of channels for a particular timeframe. The US NDC configuration has each station's channels grouped together into two-hour CONTIN class intervals.

4-164.   During the initialization phase, ArchiveLongTerm reads its `.par` file, establishes a connection to both the OPSDB and ARCHDB databases, and reads configuration information from the CHAN_GROUPS table. After initialization, ArchiveLongTerm creates, updates, and deletes intervals in the ARCHIVE_INTERVAL table. The class of these intervals are CONTIN, SEGMENT and BEAM. Old intervals are deleted, new intervals are created, and existing intervals are updated based on information from the WFACTIVITY table. The final phase of operation is to copy waveform data to the RAID storage. Each interval represents a group of channels for a particular timeframe. The US NDC configuration has each station's channels grouped together into two-hour CONTIN class intervals.

Table 4-3. Classified Archive Interval States

STATE	DESCRIPTION
empty	There is no data for this interval.
partial	There is some missing data for this interval.
full	There is no missing data for this interval.
archlong-started	ArchiveLongTerm has started to copy this data to RAID storage.
archlong-failed	ArchiveLongTerm encountered an error while trying to copy this interval to RAID storage.
archlong-done	ArchiveLongTerm successfully copied this interval to RAID storage.
emptydone	ArchiveLongTerm did not find any data to copy while working on this interval.
archperm-copy	ArchivePermanent is currently copying the file associated with this interval from RAID storage to the archive.

Table 4-3. Classified Archive Interval States (Cont)

STATE	DESCRIPTION
archperm-wait	ArchivePermanent is waiting for the files associated with this interval to be placed on DLT.
archperm-update	ArchivePermanent is waiting for the interval to reach a certain age (.par determined) before updating the wfdisc records to point to the archive file instead of the RAID file.
archperm-remove	ArchivePermanent is waiting for the interval to reach a certain age (.par determined) before removing the file in RAID storage.
archperm-failed	ArchivePermanent encountered an error while operating on this interval.
archperm-done	ArchivePermanent is done with this interval and it is completely archived.

4-165.   ARCHIVEPERMANENT.

4-166.   The program ArchivePermanent moves the files from RAID storage to archive storage. ArchivePermanent does this in stages, which ensures there is no possibility for data loss. During the initialization phase, ArchivePermanent reads its .par file and establishes a connection to the ARCHDB database. After initialization, ArchivePermanent creates and deletes intervals in the ARCHIVE_INTERVAL table. The class of these intervals is ARCHIVE. Old intervals are deleted and new intervals are created. In the last phase of operation, ArchivePermanent looks at each ARCHIVE and associated (by time) CONTIN, SEGMENT, and BEAM intervals to see if they can be advanced to the next state.

4-167.   Initially, files associated with archlong-done intervals are copied from RAID storage to archive storage. Only archlong-done intervals older than a .par determined time will be copied. Once the intervals file is copied, its state is changed to archperm-wait.

4-168.   Every time ArchivePermanent runs, it looks at each file associated with intervals in the archperm-wait state and checks to see if the file has been placed on a DLT tape by SAM-FS. When ArchivePermanent has determined that a file is on tape, it will update the associated interval's state to archperm-update.

4-169.   When an interval in the archperm-update state reaches a .par determined age, the wfdisc records, in the ARCHDB database associated with that interval, are updated to point to the file in archive storage instead of the file in RAID storage. Once this is done, the state of the interval is changed to archperm-remove.

4-170.   When an interval in the archperm-remove state reaches a `.par` determined age, its associated file in RAID storage is removed and the associated interval record is updated to the archperm-done state. When all the CONTIN, SEGMENT and BEAM class intervals are updated to the archperm-done state, the ARCHIVE_FILES records are updated so they are associated to the single ARCHIVE class interval.

SECTION V

CLASSIFIED ANALYSIS SUBSYSTEM PIPELINE PROCESSES
AND DATA FLOW

4-171. INTRODUCTION.
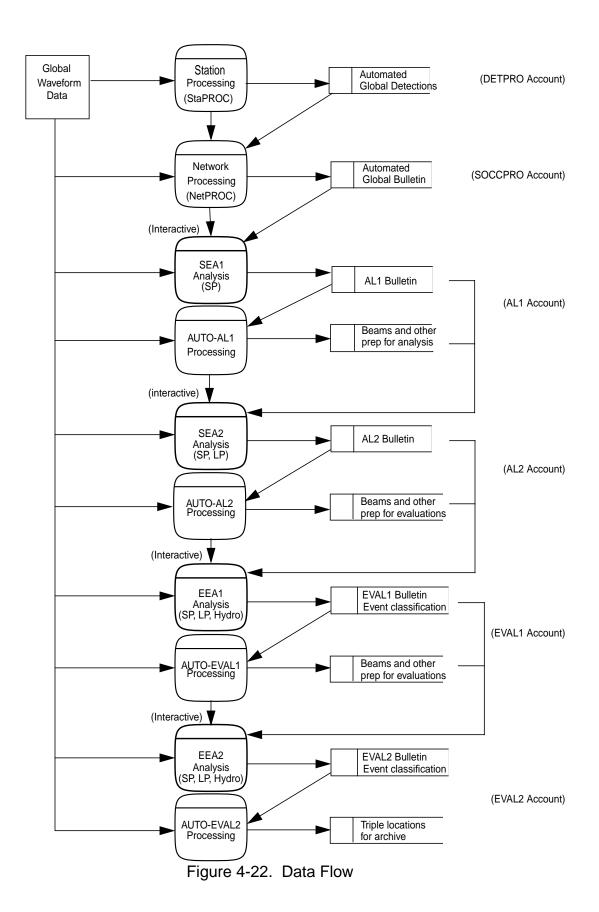
4-172. This section outlines the general data and processing flow for the numerous interactive analysis stages and automated processes used by the system. A brief description of the basic purpose of each stage or process, the corresponding input and output data, and a process flow diagram is provided. The input and output section lists the information and data for each analysis or processing stage, and the output the analysis or processing stage is expected to produce

4-173. A pipeline is a sequence of processes to be applied to a data stream. Such a sequence of processes requires a control mechanism to schedule the component processes and to monitor them for successful completion and take corrective action in case of a failure. In addition, some processes may not be running when initially requested and need to be started. A process needs to be restarted if it has failed. Therefore, the entire pipeline is divided into stages, each with internal controls. Each automated pipeline stage contains at least two of the process types described in the following paragraphs.

4-174. The Pipeline Launch and WorkFlow displays provide control and status information to the SOM as needed for management of the processing pipelines.

4-175. The Distributed Applications Control System (DACS) Manager (dman) is responsible for starting all pipeline processes not normally started by the operator from the Pipeline Launch interface. The dman process starts the Communications Agent (CommAgent), PM, and all application shells as they are needed during processing.

4-176. The CommAgent process is a component of DACS and provides a logical store-and-forward service for messages. The CommAgent intercepts message sends, stores the message in a message queue, translates the logical name of the recipient to a physical name, notifies the message recipient, and then delivers the messages when requested by the recipient. Each CommAgent is given a group name. Applications register themselves with a particular CommAgent.

4-177. The data received at the Classified System is processed differently according to the data type and the goal of the processing. Processing is accomplished with a number of pipelines, each of which is characterized by the set of processes involved and the database accounts used. The main purpose of each pipeline is summarized as follows:

4-178. The data received at the Classified System is processed differently according to the data type and the goal of the processing. Processing is accomplished with a number of

pipelines, each of which is characterized by the set of processes involved and the database accounts used. The main purpose of each pipeline is summarized as follows:

a.   The Global pipeline builds a global bulletin with short period (SP) and long period (LP) seismic data and performs classification for events of interest using seismic data and using hydroacoustic arrivals associated with offshore events.

b.   Broad Area Regional Monitoring (BARM) processing pipeline builds a bulletin for a specifically defined geographic region using seismic data recorded at selected stations located at teleseimic and regional distances from the area of interest.

c.   The Spotlight pipeline builds a regional bulletin for specified areas and estimates regional magnitude.

d.   The Look-Forward pipeline provides rapid notification of events in configurable, pre-defined target areas and validates and refines target events on an accelerated schedule, making the data available for rapid analysis.

e.   Hydroacoustic detects and identifies hydroacoustic phases with high signal-to-noise ratios (SNRs).

4-179.   The pipelines include both automated processing and interactive analysis stages. An automated process follows each analysis stage in the Global pipeline to prepare the data suite for the next stage of analysis.

4-180.   GLOBAL PIPELINE.

4-181.   The Global pipeline transforms raw waveform data into alphanumeric event data in ten stages of automated and interactive data processing. Figure 4-22 shows the data flow within the Global pipeline.

4-182.   Waveform and alphanumeric data is run through the first two stages of the pipeline to detect signals and to form preliminary events. These automated processes are referred to as station and network processing, respectively. The resulting automated bulletin is then analyzed by the first and second Seismic Event Analyst (SEA1, SEA2) and then by the first and second Event Evaluation Analyst (EEA1, EEA2). Each of the four analysis stages is followed by a stage of post-analysis processing (e.g., AUTO-AL1) to make-up the final eight stages of the Global pipeline. In addition, the evaluation stages include automated processing (AUTO-EVAL1) which is run after analyst review and before discrimination analysis (Discrim processing).

Figure 4-22. Data Flow

4-183. GLOBAL STATION PROCESSING.

4-184. Global station processing is the first stage of the Global pipeline. Global station processing (figure 4-23) runs against seismic station intervals (SEIS) and treats each seismic station in isolation, making detections, measurements, and beams according to the properties of the detections themselves. In other words, information based on the network about events is not yet available at this stage. Global station processing accomplishes all processing which can be done at the station level.
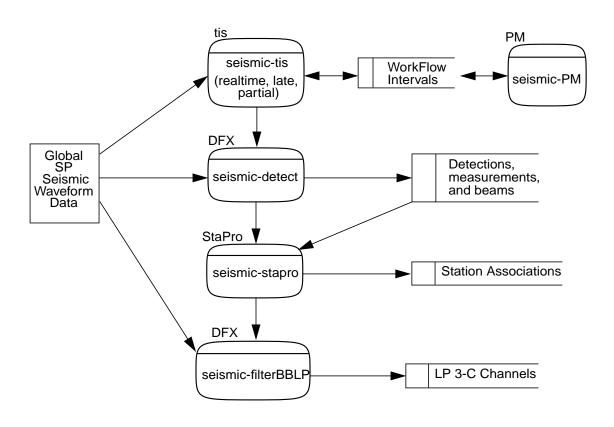
Figure 4-23. Global Station Processing Data Flow Diagram

4-185. The seismic-tis-realtime process monitors the incoming raw data in a candidate 15-minute time interval for a station. It creates a SEIS interval with a state of queued in the global database account and initiates processing on the interval when a parameter-determined percentage of the interval is covered by at least one station channel. If a candidate interval does not become filled to the specified percentage but it is more than 15 percent filled, then seismic-tis-realtime creates a partial interval. If the candidate interval does not become 15 percent filled, then seismic-tis-realtime creates a skipped interval.

4-186. When approximately ten minutes have elapsed since a partial interval was created, which gives the Data Acquisition Subsystem a finite amount of time to fill-in the time interval, seismic-tis-partial updates the state of the interval to pending, and seismic-tis-realtime

initiates processing on the interval. If a skipped interval becomes more than 15 percent filled, seismic-tis-late updates the state of the interval to pending or partial, as appropriate, and seismic-tis-realtime initiates processing on the interval.

4-187. The seismic-PM process schedules and controls the following sequence of processes to be run on each SEIS interval marked queued by the seismic-tis-realtime process. As the processing is performed, the PM updates the state of the interval to show the current active process in the sequence. When processing is completed, seismic-PM sets the state of the interval to station-done. If one of the processes fails, seismic-PM will attempt to rerun the process. If the process fails a second time, seismic-PM will set the state of the interval to failed.

4-188. The seismic-detect process creates arrival records for valid signals detected on seismic stations. These records contain information such as the arrival onset time, SNR, amplitude, and period. It then attempts to generate a five-minute arrival beam around each arrival, to correspond to the feature measurements made on the arrivals. For array stations, the beam is based on the azimuth and slowness determined from the fk spectrum of the arrival. When there is not enough waveform data to generate a full five-minute beam, it is left to the network processing stage of the Global pipeline to generate the arrival beams. For ASN stations, detection processing will normally run against the broadband (BB) waveform data for the station. If there is no BB data for an ASN station interval, the detection processing will run against the available SP data instead.

4-189. The seismic-stapro process groups together arrivals for each station reasonably presumed to have a common origin. The grouping together of arrivals is made on the basis of azimuth and slowness for array and three-component sites, as well as on the basis of time of arrival for single-component stations. This station grouping lessens the likelihood that network association processing will create false multiple events using later arrivals from a single origin.

4-190. The seismic-filterBBLP process applies filters to derive true LP waveforms from BB waveforms for stations which do not transmit the LP channels. In most cases, the center element of each LP array is transmitted as a BB channel, making it unsuitable for LP interpretation. This process creates LP channels consistent with the other LP array elements, suitable for interpretation of LQ (Love Wave) and LR (Raleigh Wave) surface waves. Only a subset of the stations in the global network are configured for this processing. For ASN stations, if there is no BB data for the station interval, the processing will convert the available SP data to BB data instead.

4-191. GLOBAL NETWORK PROCESSING.

4-192. Global network processing (NetPROC) is the second stage of the Global pipeline. Global network processing (figure 4-24) starts when enough station data has accumulated to form a network (NET) interval. The processing assembles the detection data from the available stations to produce event locations based on multiple stations.

4-193. The network-tin process monitors the number of processed station intervals in a candidate 30-minute time interval and creates a NET interval in the global database account when the number reaches the configured threshold. After an initial wait time of 40 minutes, network-tin creates the interval and initiates processing only when station processing has completed on most of the stations in the network. If not enough station processing has completed, network-tin drops the threshold and waits an additional five minutes before creating and processing the interval. This is repeated until the number of stations processed exceeds the threshold. If sufficient data is not received, the threshold drops below a reasonable level for an association of the available arrivals, at which point the candidate time interval is skipped.
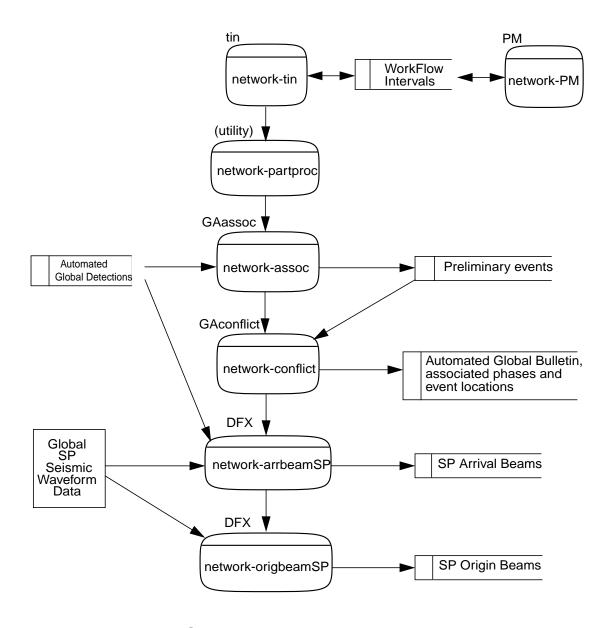
Figure 4-24. Global Network Processing Data Flow Diagram

4-194. The network-PM process schedules and controls the following sequence of processes to be run on each NET interval marked queued by the network-tin process. As the processing is performed, the PM updates the state of the interval to show the current active process in the sequence. When processing is complete, network-PM sets the state of the interval to network-done. If one of the processes other than the network-conflict process fails, network-PM will attempt to rerun the process. If the process fails a second time, seismic-PM will set the state of the interval to failed.

4-195. The network-partproc process initiates station processing on all partial station intervals within the network interval. When the seismic-tis-realtime process determines an interval is less than 100 percent filled, it creates a partial interval. While normally a waiting period will elapse before the interval is processed to allow data acquisition additional time to receive any available data, network-partproc is used to stop the wait so station processing will proceed on the partial intervals. Then network-partproc will wait up to five minutes for any active station processing within the network interval to complete.The network-partproc process initiates station processing on all partial station intervals within the network interval. When the seismic-tis-realtime process determines an interval is less than 100 percent filled, it creates a partial interval. While normally a waiting period will elapse before the interval is processed to allow data acquisition additional time to receive any available data, network-partproc is used to stop the wait so station processing will proceed on the partial intervals. Then network-partproc will wait up to five minutes for any active station processing within the network interval to complete.

4-196. The network-assoc (GAassoc) and network-conflict (GAconflict) processes are collectively known as Global Association (GA). The network interval processed represents the time period of arrivals to be associated together. A look-back of 20 minutes is applied by GA to the start-time of the interval to account for the event origin times of any associated arrivals in the interval. GA produces seismic origins by associating three or more station detections, then writes the results to the soccpro database account.

4-197. The network-assoc process associates seismic detections to events and locates the events. It takes the detection data provided by station processing and uses an algorithm to group the detections into events. The output is a preliminary set of event data stored in the working tables origin_ga, origerr_ga, and assoc_ga for refinement by the network-conflict process.

4-198. The network-conflict process resolves conflicts between the set of events contained in the working tables produced by network-assoc and the set of events found in the output origin, origerr, and assoc tables. Resolutions are made for events which overlap and detections associated to the wrong event. While resolving conflicts, it also adds defining phases to events where the detections fall within parameters. It then sends the results to the origin, origerr, and assoc database tables.

4-199. When the network-assoc process first becomes active, it changes the state of the set of station processing time intervals covered by the network processing time interval from station-done to assoc-started. This shows which station processing intervals were

completed in time for incorporation into the event bulletin produced by network processing. When the network-conflict process completes, it changes the state of the same set of station processing intervals to network-done. Station processing intervals which did not complete in time for network processing will not change from station-done to network-done unless there were no arrivals produced by the processing.

4-200.   The network-abeamSP process creates arrival beams for arrivals which do not already have beams. In station processing, arrival beams are configured to be five minutes long, and sometimes there may not be enough data to form a beam for a given arrival. The network-arrbeamSP process relaxes the five-minute requirement and creates arrival beams from whatever waveform data is available. Forming some of the arrival beams during network processing allows data acquisition additional time to receive any available data, so potentially a greater percent of the arrival beams will be five minutes long.

4-201.   The network-obeamSP process forms SP origin beams for non-detecting stations for the set of events covered by a network interval. The term origin beam is used to indicate a beam whose parameters are based upon the location of the defining event, rather than on the characteristics of an arrival. In the absence of any other information, the origin beam should be optimal for detection of arrivals from that origin. The processing determines the theoretical time for arrivals expected from each event/station pair for the stations which do not have an initial P detection associated to the event, and then forms the beam from waveform data around the theoretical time.

4-202.   SEA1 ANALYSIS.

4-203.   SEA1 analysis is the third stage of the Global pipeline. The primary goal in SEA1 analysis (figure 4-25) is to review and refine the event solutions generated by the automated processing system using all available SP data. When global network processing has completed five 30-minute intervals, the SEA1 analyst can begin to process the two-hour block covering the first four of the network intervals. The SEA1 analyst starts with a read of the data into the Analyst Review Station (ARS), which creates an ARS al1 interval. The analyst reviews the events formed by network processing and refines arrival and event data as necessary. When the SEA1 analyst issues the Save Data command, ARS saves the remaining unassociated arrivals to the al1 account, automatically creates a post-analyst processing AUTO-AL1 interval in the global account, and initiates AUTO-AL1 processing on the interval.

4-204.   The input to SEA1 analysis is the Automated Global Bulletin in the soccpro database account (accessed through the in_* synonyms in the al1 account) and any results which were saved in the al1 account during a previous SEA1 analysis session for the same interval or for the adjacent intervals. Information in the al1 account regarding a particular event, arrival, etc., takes precedence over the same information found in the soccpro account.

Figure 4-25. SEA1 Analysis Process Flow Diagram

4-205. In SEA1 analysis, event solutions are obtained using a multi-stage iterative procedure during which the origins are refined and augmented by:

    a.   Locating the event.

    b.   Adjusting existing detections (e.g., associating, re-timing, renaming).

    c.   Adding new detections.

    d.   Relocating the event to include the additional/modified information.

    e.   Verifying the additional/modified information is consistent with the event.

4-206. AUTO-AL1 PROCESSING.

4-207.   AUTO-AL1 processing is the fourth stage of the Global pipeline. AUTO-AL1 processing (figure 4-26) prepares the input data for the SEA2 analyst by creating all necessary beams and measurements based on the results saved by the SEA1 analyst.
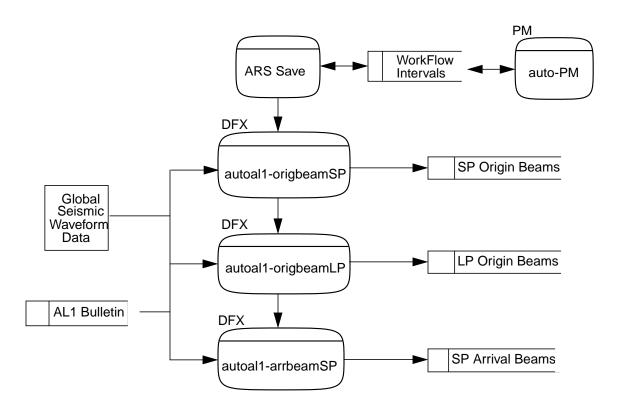
Figure 4-26. AUTO-AL1 Processing Data Flow Diagram

4-208.   The auto-PM process schedules and controls the following sequence of processes to be run on each AUTO-AL1 interval in the global database account marked queued by ARS. As the processing is performed, auto-PM updates the state of the interval to show the current active process in the sequence. When processing is completed, auto-PM sets the state of the interval to done. If one of the processes fails, auto-PM will attempt to rerun the process. If the process fails a second time, auto-PM will set the state of the interval to failed.

4-209.   The autoal1-origbeamSP process creates SP origin beams for new events which were formed by the SEA1 analyst and updates any existing origin beams to account for potentially significant differences in beam-steering resulting from changes in event locations. The analyst does not save any origin beams, since they are efficiently created in the post-analysis processing. The processing makes noise P phases and measures the noise amplitude and period at the theoretical time for non-detecting stations in the appropriate distance range. The noise statistics are used to help define the maximum-likelihood body-wave magnitude for an event.

4-210. The autoal1-origbeamLP process creates LP origin beams around the predicted arrival times of the LQ and LR surface wave phases for the origins saved in the al1 account. Vertical and transverse beams are created for analysis of LR and LQ waves, respectively.

4-211. The autoal1-arrbeamSP process creates arrival beams for arrivals which do not already have beams. The arrival beams are configured to be five minutes long, but when there is not enough data to create a five-minute beam for a given arrival, it will create the beam from whatever waveform data is available. The analyst does not save any arrival beams, since they are efficiently created in the post-analysis processing.

4-212. SEA2 ANALYSIS.

4-213. SEA2 analysis is the fifth stage of the Global pipeline. The primary goal in SEA2 analysis is to review and refine the event solutions generated by the SEA1 analyst. SEA2 analysis (figure 4-27) differs from SEA1 analysis primarily in that the SEA2 analyst is provided LP data to work with in addition to the SP data. SEA2 analysis includes all of the steps in SEA1 analysis plus the additional steps required to add LP detections and the associated amplitude and period measurements. The SEA2 analyst starts with a read of the data into ARS which creates an ARS al2 interval in the global database account. The analyst reviews the events formed by the SEA1 analyst and refines arrival and event data as necessary. When the SEA2 analyst issues the Save Data command, ARS saves the remaining unassociated arrivals to the al2 account, automatically creates a post-analyst processing AUTO-AL2 interval in the global account, and initiates AUTO-AL2 processing on the interval'

4-214. The input to SEA2 analysis is the SEA1 Bulletin in the al1 database account (accessed through the in_* synonyms in the al2 account) and any results which were saved in the al2 account during a previous SEA2 analysis session for the same interval or for the adjacent intervals. Information in the al2 account regarding a particular event, arrival, etc., takes precedence over the same information found in the al1 account.

4-215. In SEA2 analysis, event solutions are obtained using a multi-stage iterative procedure during which the origins are refined and augmented by:

    a.   Locating the event.

    b.   Adding new detections (late data).

    c.   Relocating the event to include the additional/modified information.

    d.   Verifying the additional/modified information is consistent with the event.
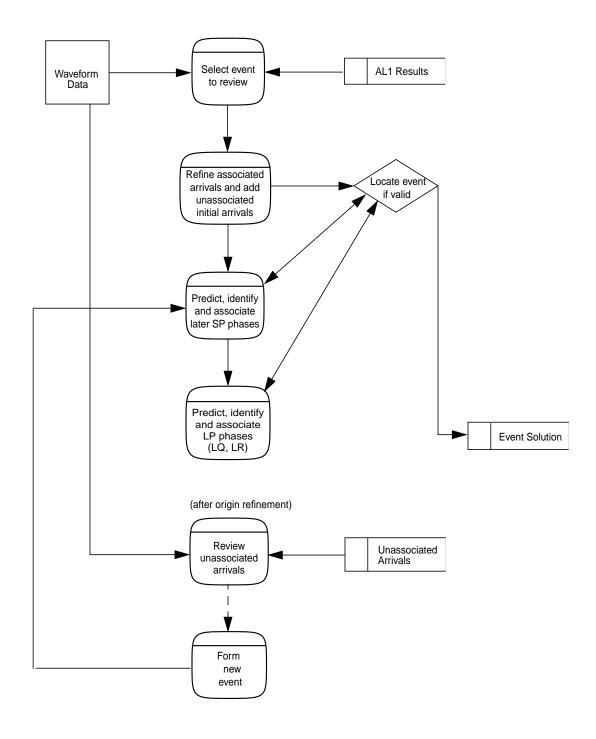
Figure 4-27. SEA2 Analysis Process Flow Diagram

4-216. AUTO-AL2 PROCESSING.

4-217. AUTO-AL2 processing is the sixth stage of the Global pipeline. AUTO-AL2 processing (figure 4-28) prepares the input data for the EEA1 analyst by creating all

necessary beams and measurements based on the results saved by the SEA2 analyst. The processing duplicates the AUTO-AL1 processing, and adds processes to determine the maximum-likelihood bodywave magnitudes for events, to create AFTAC triple locations for events, and to search for hydroacoustic arrivals to associate to the oceanic events.
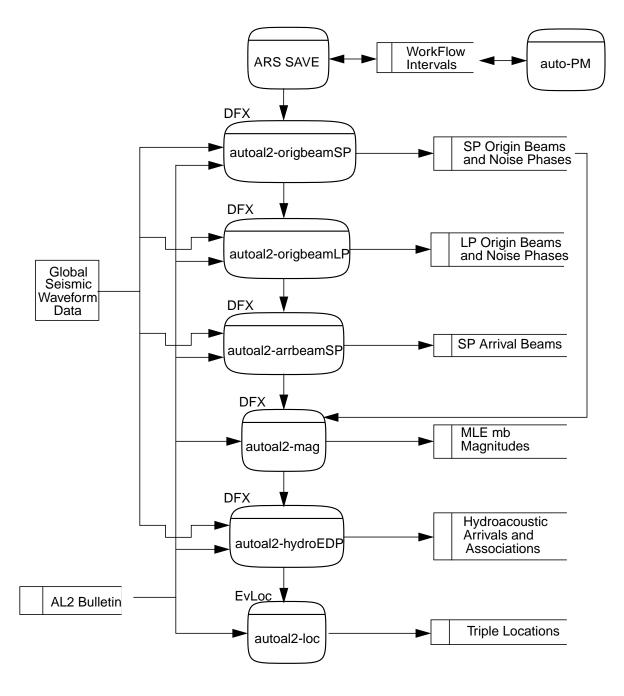
Figure 4-28. AUTO-AL2 Processing Data Flow Diagram

4-218.   The autoal2-obeamSP process creates SP origin beams for new events which were formed by the SEA2 analyst and updates any existing origin beams to account for potentially significant differences in beam-steering resulting from changes in event locations. The analyst does not save any origin beams, since they are efficiently created in the post-analysis processing. The processing makes noise P phases and measures the noise amplitude and period at the theoretical time for non-detecting stations in the appropriate distance range. The noise statistics are used to help define the maximum-likelihood body-wave magnitude for an event.

4-219.   The autoal2-obeamLP process creates LP origin beams around the predicted arrival times of the LQ and LR surface wave phases for events saved in the al2 account. Vertical and transverse beams are created for analysis of Rayleigh and Love waves, respectively.

4-220.   The autoal2-abeamSP process creates arrival beams for arrivals which do not already have beams. The arrival beams are configured to be five minutes long, but when there is not enough data to create a five-minute beam for a given arrival, it will create the beam from whatever waveform data is available. The analyst does not save any arrival beams, since they are efficiently created in the post-analysis processing.

4-221.   The autoal2-mag process utilizes noise measurements to compute the maximum-likelihood bodywave magnitudes for events. Incorporating the measurements of noise level at stations which did not report arrivals improves the estimate of the magnitude.

4-222.   The autoal2-hydroEDP process identifies hydroacoustic signals produced by earthquakes or other events under the surface of the ocean. Hydroacoustic phases travel comparatively slow, and may arrive at sensors many minutes or hours after the seismic phases have all been received. Thus, an accurate seismic location can sometimes be used to predict hydroacoustic arrivals in advance. For the set of offshore seismic events covered by an ARS al2 interval, the event-driven processing calculates the theoretical arrival times for hydroacoustic phases, then attempts to find hydroacoustic detections based on those predictions. Arrivals meeting appropriate criteria are then associated with the events and written to the AL2 database.

4-223.   The autoal2-loc process determines three possible solutions for the event location: surface location, restrained location, and free location. Locations redundant with an analyst-restrained location are not made. For example, if the analyst-restrained location is at the surface, then no surface location is added. The triple-location results may be used as an aid to event classification. The solutions are saved in the evloc_* and af_* tables which are not read/accessed by the interactive processing software.

4-224.   EEA1 ANALYSIS.

4-225.   EEA1 analysis is the seventh stage of the Global pipeline. EEA1 analysis (figure 4-29) differs from SEA2 analysis primarily in that the EEA1 analyst also classifies the area of interest (AI) event solutions into categories of interest using all available waveform

data sources, including hydroacoustic data. The EEA1 analyst starts with a read of the data into ARS, which creates an ARS eval1 interval. The analyst reviews the events formed by the SEA2 analyst and refines arrival and event data as necessary. When the EEA1 analyst issues the Save Data command, ARS saves the remaining unassociated arrivals to the eval1 account, automatically creates a post-analyst processing AUTO-EVAL1 interval in the global account, and initiates AUTO-EVAL1 processing on the interval. This stage is the first where DoE KB travel-time corrections and/or GIS products may be employed.
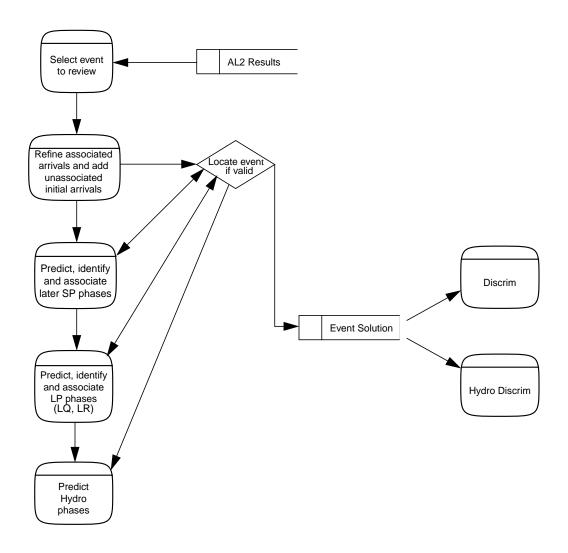
Figure 4-29. EEA1 Analysis Process Flow Diagram

4-226. The input to EEA1 analysis is the SEA2 Bulletin in the al2 database account (accessed through the in_* synonyms in the eval1 account) and any results that were saved in the eval1 account during a previous EEA1 analysis session for the same interval or for the adjacent intervals. Information in the eval1 account regarding a particular event, arrival, etc., takes precedence over the same information found in the al2 account.
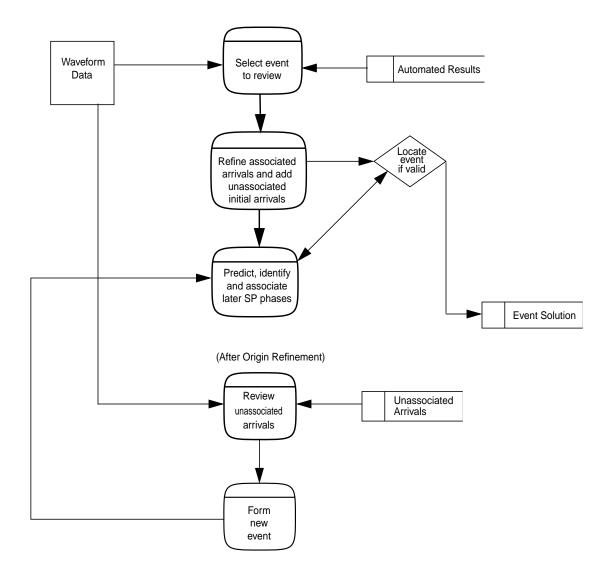
4-227.   In EEA1 analysis, event solutions are obtained using a multi-stage iterative procedure during which the origins are refined, augmented, and finally classified by:

      a.   Distinguishing between events in AI and outside areas of interest (OAI).

      b.   Saving the final event solution as appropriate for the AI or OAI events.

      c.   Initiating Discrim analysis on AI events.

      d.   Initiating Hydro-Discrim analysis on oceanic AI events.

4-228.   DISCRIM AUTOMATED PROCESSING.

4-229.   The Discrim application is an analyst-invoked software tool which is part of EEA1 and EEA2. It requires a specific set of measurements at all available stations for an event, and certain discrimination-specific database tables need to be filled in. Therefore, when an analyst selects the Discrim button in the ARS menu bar, an automated processing pipeline is invoked to prepare all the needed information. See figure 4-30.

4-230.   The PM process schedules and controls the following sequence of processes to be run on a saved event. When the sequence is completed, it then starts or updates the Discrim application itself. PM will not rerun processes automatically when a failure is encountered.

4-231.   The discrim-origbeamSP process makes SP origin beams and noise measurements from the beams.

4-232.   The discrim-classampSP process makes SP classification measurements of several types of amplitude, period, signal, and noise in various time windows from the arrival beam.

4-233.   The discrim-origbeamLP process makes SP origin beams and noise measurements from the beams.

4-234.   The discrim-origampNL process measures the LP noise level in a window preceding the predicted primary arrival (P or PKPdf) for a station which has no LP phases (LR or LQ) associated. The purpose is to measure a noise level before the event with which the noise amplitude measured at the predicted time for LR can be compared.

4-235.   The discrim-msnmag process determines the maximum-likelihood surface-wave noise magnitude (msn) for an event, including noise measurements at stations without surface wave amplitude measurements.
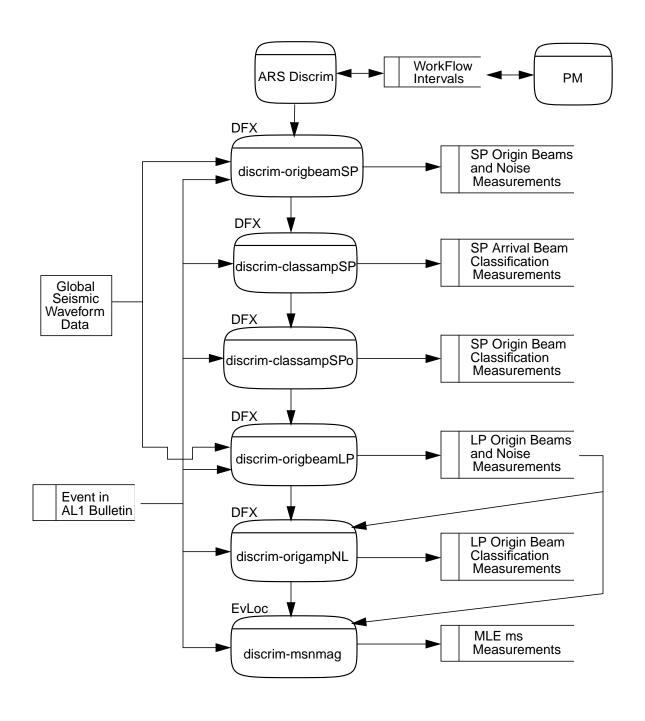
Figure 4-30. Discrim Automated Processing Data Flow Diagram

4-236.   DISCRIM ANALYSIS.

4-237.   The purpose of Discrim analysis is to verify and, when necessary, modify the individual measurements and final classification votes for seismic observations. Discrim analysis is conducted for AI and noteworthy OAI events. See figure 4-31. The Discrim program itself lies at the end of the Discrim Automated Processing pipeline which creates origin beams and computes the numerous measurements needed for event classification using seismic observations (e.g., the pre-P LP noise measurement made on the LP origin beam). Therefore, it is necessary that arrival onset time adjustments and other event refinements must be completed before initiating this processing.
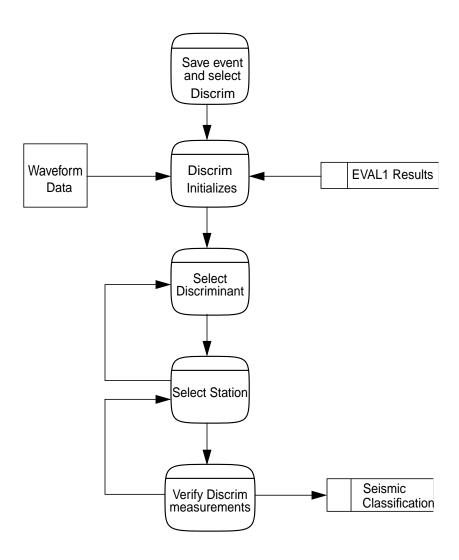
Figure 4-31. Discrim Analysis Process Flow Diagram

4-238.   HYDRO-DISCRIM ANALYSIS.

4-239.   The purpose of Hydro-Discrim analysis is to verify and, when necessary, modify the individual measurements and final classification votes for hydroacoustic observations. Hydro-Discrim analysis is conducted for oceanic AI and noteworthy OAI events. See figure 4-32. Unlike Discrim, Hydro-Discrim is not preceded by automated processing. The Hydro Display toolbar (HDT) item in ARS merely initiates a process which populates the necessary database tables and invokes the hydrodisplay tool.
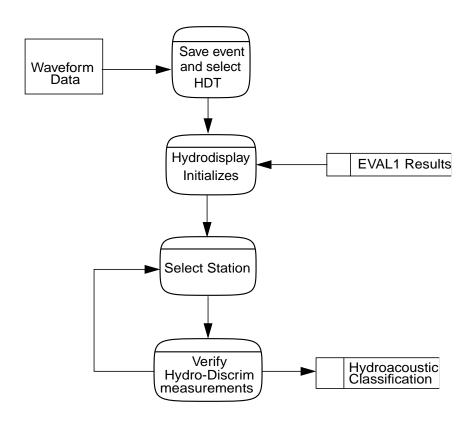
Figure 4-32. Hydro-Discrim Analysis Process Flow Diagram

4-240.   AUTO-EVAL1 PROCESSING.

4-241.   AUTO-EVAL1 processing is the eighth stage of the Global pipeline. AUTO-EVAL1 processing prepares the input data for the EEA2 analyst by creating SP origin beams and noise measurements for AOI events, determining the maximum-likelihood bodywave magnitudes for events, and creating AFTAC triple locations for events. See figure 4-33.
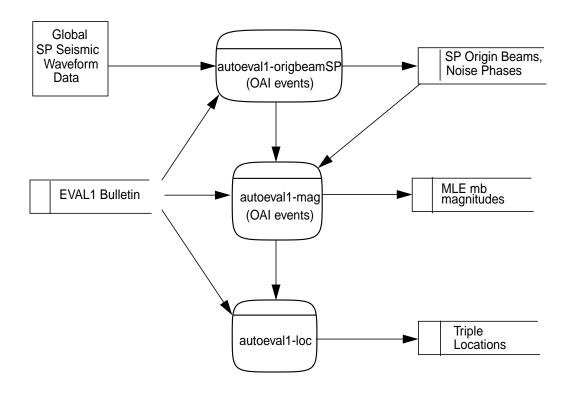
Figure 4-33. AUTO-EVAL1 Processing Data Flow Diagram

4-242.   The autoeval1-origbeamSP process creates SP origin beams for new events which were formed by the EEA1 analyst and updates any existing origin beams to account for potentially significant differences in beam-steering resulting from changes in event locations. The analyst does not save any origin beams, since they are efficiently created in the post-analysis processing. The processing makes noise P phases and measures the noise amplitude and period at the theoretical time for non-detecting stations in the appropriate distance range. The noise statistics are used to help define the maximum-likelihood body-wave magnitude for an event.

4-243.   The autoal2-mag process utilizes noise measurements to compute the maximum-likelihood bodywave magnitudes for events. Incorporating the measurements of noise level at stations which did not report arrivals improves the estimate of the magnitude.

4-244.   The autoal2-loc process determines three possible solutions for the event location: surface location, restrained location, and free location. Locations redundant with an analyst-restrained location are not made. For example, if the analyst-restrained location is at the surface, then no surface location is added. The triple-location results may be used as an aid to event classification. The solutions are saved in the evloc_* and af_* tables which are not read/accessed by the interactive processing software.

4-245.   EEA2 ANALYSIS.

4-246.   EEA2 analysis is the ninth stage of the Global pipeline. EEA2 analysis differs from EEA1 analysis primarily in that the EEA2 analyst may classify the AI event solutions into categories of interest using all available waveform data sources including hydroacoustic data. See figure 4-34. The EEA2 analyst starts with a read of the data into ARS, which creates an ARS eval2 interval. The analyst reviews the events formed by the EEA1 analyst and refines arrival and event data as necessary. When the SEA2 saves the results, ARS automatically creates a post-analyst processing AUTO-EVAL2 interval and requests it to be processed by the auto-PM process.
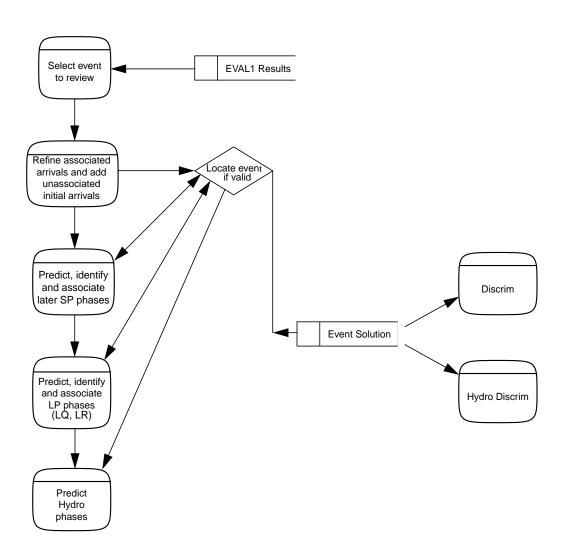
Figure 4-34. EEA2 Analysis Process Flow Diagram

4-247. The input to EEA2 analysis is the EEA1 Bulletin in the eval1 database account (accessed through the in_* synonyms in the eval2 account) and any results saved in the eval2 account during a previous EEA2 analysis session for the same interval or for the adjacent intervals. Information in the eval2 account regarding a particular event, arrival, etc., takes precedence over the same information found in the eval1 account.

4-248. In EEA2 analysis, event solutions are obtained using a multi-stage iterative procedure during which the origins are refined, augmented, and finally classified by:

      a.   Saving the final event solution.

      b.   Initiating Discrim analysis on AI events.

      c.   Initiating Hydro-Discrim analysis on oceanic AI events.

4-249. AUTO-EVAL2 PROCESSING.

4-250. AUTO-EVAL2 processing is the final stage of the Global pipeline. AUTO-EVAL2 processing prepares the input data for the EEA2 analyst by creating SP origin beams and noise measurements for AOI events, determining the maximum-likelihood bodywave magnitudes for events, and creating AFTAC triple locations for events. See figure 4-35.
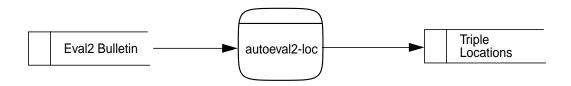
Figure 4-35. AUTO-EVAL2 Processing Data Flow Diagram

4-251. BARM PIPELINE.

4-252. The BARM pipeline transforms raw waveforms into alphanumeric event data through two stages of automated processing and one stage of interactive processing. The analysis stage is followed by a stage of post-analysis processing (AUTO-BARAL1). Events located within a selected broad-area region are formed using a subset of the available seismic stations at regional and teleseismic distances from the region. The purpose of the pipeline is to detect events within the selected region at lower thresholds than those achieved with the Global pipeline. To that end, event definition criteria are relaxed. Figure 36 shows the data flow within the BARM pipeline.
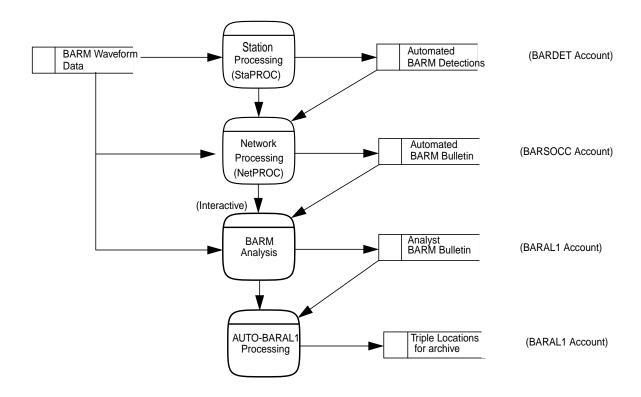
Figure 4-36. BARM Pipeline Data Flow Diagram

4-253.   Waveform and alphanumeric data are run through station processing and network processing to detect signals and to form preliminary events, respectively. The resulting automated bulletin is then analyzed by a BARM analyst. The primary goal of a BARM analyst is to review, validate, refine and, when possible, augment the event solutions generated by the automated processing. The interactive stage also provides evaluation capabilities. It includes automated processing which is run after analyst review and before discrimination analysis (Discrim processing).

4-254.   BARM STATION PROCESSING.

4-255.   BARM station processing (StaPROC) is the first stage of the BARM pipeline. BARM station processing (figure 4-37) runs against BARM seismic station intervals and treats each station in isolation, making detections, measurements, and beams according to the properties of the detections themselves. Network information about events is not available at this stage. BARM station processing accomplishes all the processing that can be done at the station level.
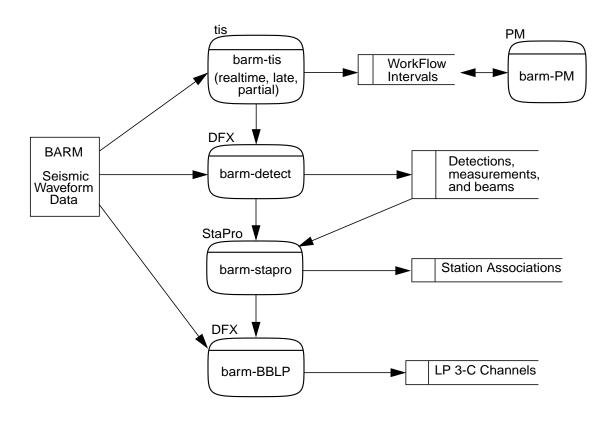
Figure 4-37. BARM Station Processing Data Flow Diagram

4-256.   The barm-tis-realtime process monitors the incoming raw data in a candidate time interval of a specified length for a station. It creates a BARM interval with a state of 'queued' in the BARM database account and initiates processing on the interval when approximately 100 percent of the interval is covered by at least one station channel. If a candidate interval does not become nearly 100 percent filled, but it is more than 15 percent filled, then barm-tis-realtime creates a 'partial' interval. If the candidate interval does not become nearly 15 percent filled, then barm-tis-realtime creates a 'skipped' interval.

4-257.   When approximately 10 minutes have elapsed since a 'partial' interval was created, which gave the DAS a finite amount of time to fill-in the time interval, barm-tis-partial updates the state of the interval to 'pending', and barm-tis-realtime initiates processing on the interval. If a 'skipped' interval becomes more than 15 percent filled, barm-tis-late updates the state of the interval to 'pending' or 'partial' as appropriate, and barm-tis-realtime initiates processing on the interval.

4-258.   The barm-PM process schedules and controls a sequence of processes to be run on each BARM interval marked 'queued' by the barm-tis-realtime process. As the processing is performed, the PM updates the state of the interval to show the current active process in the sequence. When processing is completed, barm-PM sets the state of the interval to 'station-done'. If one of the processes fails, then barm-PM will attempt.

4-259. The barm-detect process creates arrival records for valid signals detected on seismic stations. These records contain information such as the arrival onset time, signal-to-noise ratio, amplitude, and period. It then attempts to generate an arrival beam around each arrival, to correspond to the feature measurements made on the arrivals. For array stations, the beam is based on the azimuth and slowness determined from the f-k spectrum of the arrival. When there is not enough waveform data to generate the full beam, it is left to the network processing stage of the BARM pipeline to generate the arrival beams.

4-260. The barm-stapro process groups together arrivals for each station that can reasonably be presumed to have a common origin. The grouping together of arrivals is made on the basis of azimuth and slowness for array and three-component sites. This station grouping lessens the likelihood that network association processing will create false multiple events using later arrivals from a single origin.

4-261. The barm-BBLP process applies filters to derive long period (LP) waveforms from broadband (BB) waveforms, for stations that are not processed by the Global pipeline and which do not transmit LP data from the station site. The LP channels are suitable for analysis and interpretation of surface waves (LQ and LR).

4-262. BARM NETWORK PROCESSING.

4-263. BARM network processing (NetPROC) is the second stage of the BARM pipeline. BARM network processing (figure 4-38) starts when enough station data have accumulated to form a network interval (BNET). This involves assembling detection data to produce event locations based on multiple stations.

4-264. The bnetwork-tin process monitors the number of processed station intervals in a candidate time interval of a specified length and creates a BNET interval in the BARM database account when the number reaches the configured threshold. After an initial wait time of 40 minutes, bnetwork-tin creates the interval and initiates processing only when station processing has completed on most of the stations in the network. If not enough station processing has completed, bnetwork-tin drops the threshold and waits an additional 5 minutes before creating and processing the interval. This is repeated until the number of stations processed exceeds the threshold. Eventually, if sufficient data are not received, the threshold drops below a reasonable level for the association of available arrivals, at which point the candidate time interval is skipped.

4-265. The bnetwork-PM process schedules and controls a sequence of processes to be run on each BNET interval marked 'queued' by the bnetwork-tin process. As the processing is performed, the PM updates the state of the interval to show the current active process in the sequence. When processing is completed, bnetwork-PM sets the state of the interval to 'network-done.' If one of the processes other than the bnetwork-conflict process fails, then bnetwork-PM will attempt to rerun the process. If the process fails a second time, then bnetwork-PM will set the state of the interval to 'failed'.

Figure 4-38. BARM Network Processing Data Flow Diagram

4-266.   The bnetwork-partproc process initiates station processing on all partial station intervals within the network interval. When the barm-tis-realtime process determines that an interval is less than 100 percent filled, it creates a partial interval. While normally a waiting period elapses before the interval is processed to allow data acquisition additional time to

receive any available data, bnetwork-partproc stops the wait so that station processing proceeds on the partial intervals. Then bnetwork-partproc waits up to 5 minutes for any active station processing within the network interval to complete.

4-267.   The bnetwork-assoc (GAassoc) and bnetwork-conflict (GAconflict) processes are collectively known as BARM Association (GA). The network interval processed represents the time period of arrivals to be associated together. A look-back is applied by GA to the start-time of the interval to account for the event origin times of any associated arrivals in the interval. GA produces seismic origins by associating station detections, and then writes the results to the barsocc database account.

4-268.   The bnetwork-assoc process associates seismic detections to events and locates the events. It takes the detection data provided by station processing and uses an algorithm to group the detections into events. The output is a preliminary set of event data stored in the working tables origin_ga, origerr_ga, and assoc_ga, for refinement by the bnetwork-conflict process.

4-269.   The bnetwork-conflict process resolves conflicts between the set of events contained in the working tables produced by bnetwork-assoc and the set of events found in the output origin, origerr, and assoc tables. Resolutions are made for events that overlap and detections that are associated to the wrong event. While resolving conflicts, it also adds defining phases to events where the detections match parameterized constraints. It then outputs the merged results to the origin, origerr, and assoc database tables. Body-wave network magnitude, mb, is estimated, when applicable. Station magnitudes are written to the stamag database table, while network magnitudes are written to the netmag and origin tables.

4-270.   When the bnetwork-assoc process first becomes active, it changes the state of the set of station processing time intervals covered by the network processing time interval from 'station-done' to 'assoc-started'. This shows which station processing intervals were completed in time for incorporation into the event bulletin produced by network processing. When the bnetwork-conflict process completes, it changes the state of the same set of station processing time intervals to 'network-done.' Station processing intervals which did not complete in time for network processing will not change the state from 'station-done' to 'network-done', unless there were no arrivals produced by the processing.

4-271.   The bnetwork-abeamSP process creates arrival beams for arrivals that do not already have beams. In station processing, sometimes there may not be enough data to form a beam for a given arrival. The bnetwork-abeamSP process creates arrival beams from whatever waveform data is available. Forming some of the arrival beams during network processing, allows data acquisition additional time to receive any available data, so that potentially a greater percentage of the arrival beams complete.

4-272.   The bnetwork-obeamSP process forms SP origin beams for non-detecting stations for the set of events covered by a network interval. The term 'origin beam' is used to indicate a beam whose parameters are based upon the location of the defining event, rather than on

the characteristics of an arrival. In the absence of any other information, the origin beam should be optimal for detection of arrivals from that origin. The processing determines the theoretical time for arrivals expected from each event/station pair, for the stations that do not have an initial P detection associated to the event, and then forms the beam from waveform data around the theoretical time. The processing can be configured so that SP origin beams are formed only for events that meet specific criteria.

4-273.   The bnetwork-obeamLP process, similar to the bnetwork-obeamSP process, forms LP origin beams for non-detecting stations for the set of events covered by a network interval. The processing creates LP origin beams around the predicted arrival times of the LQ and LR surface wave phases for the origins. Vertical and transverse beams are created for analysis of Rayleigh and Love waves, respectively. The processing can be configured so that LP origin beams are formed only for events that meet specific criteria.

4-274.   BARM ANALYSIS.

4-275.   BARM analysis is the third stage of the BARM pipeline. The primary goal in BARM analysis (figure 4-39) is to review and refine the event solutions generated by the automated processing system, using all available SP data. When BARM network processing has completed a specified number of intervals, the BARM analyst can begin to process a 2 hour-block. The BARM analyst starts with a read of the data into ARS, which creates an ARS baral1 interval. The analyst reviews the events formed by network processing, and refines arrival and event data as necessary. When the BARM analyst issues the **Save Data** command, ARS saves the remaining unassociated arrivals to the baral1 account.

4-276.   The input to BARM analysis is the Automated Bulletin in the barsocc database account (accessed through the in_* synonyms in the baral1 account), and any results that were saved in the baral1 account during a previous BARM analysis session for the same interval or for the adjacent intervals. Information in the baral1 account regarding a particular event, arrival, etc., takes precedence over the same information found in the barsocc account.

4-277.   In BARM analysis, event solutions are obtained using a multi-stage iterative procedure during which the origins are refined and augmented by:

    a.   Locating the event.

    b.   Adjusting existing detections (e.g., associating, re-timing, renaming).

    c.   Adding new detections.

    d.   Making arrivals defining/non-defining for location/magnitude.

    e.   Relocating the event to include the additional/modified information.

    f.   Verifying that the additional/modified information is consistent with the event.
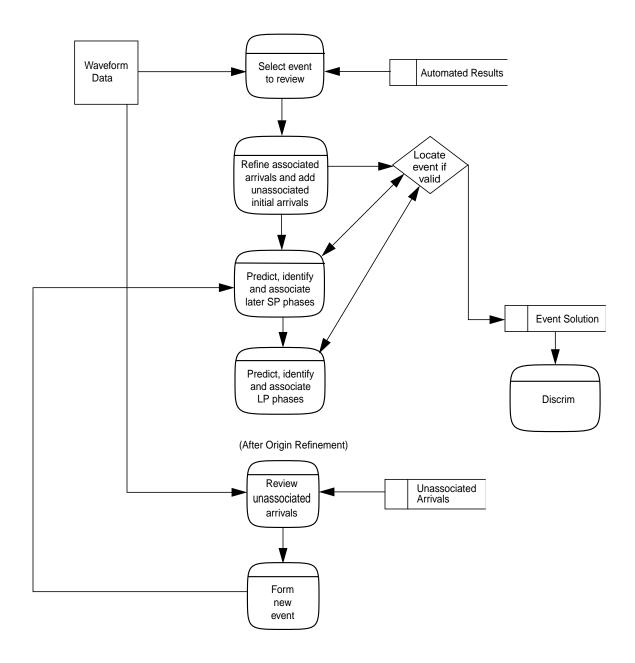
Figure 4-39. BARM Analysis Process Flow Diagram

4-278. BARM analysis also includes the capability to classify events by initiating Discrim analysis for selected events. Discrim automated processing and analysis are described in the Section for the Global Pipeline. This interactive stage is followed by a post-analysis automated processing stage, AUTO-BARAL1, described in figure 4-40. The purpose of this last stage is to calculate triple locations and to populate the AFTAC extension tables for archiving.
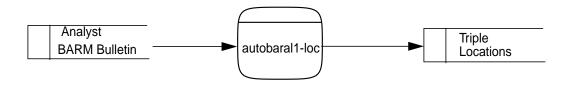
Figure 4-40. AUTO-BARAL1 Processing Data Flow

4-279. SPOTLIGHT PIPELINE.

4-280.   The Spotlight pipeline transforms raw waveform data into alphanumeric event data in one stage of automated and interactive data processing, respectively. The purpose of the Spotlight pipeline is to allow for continuous monitoring of an area of special concern using lower thresholds (e.g., relaxed event formation criteria). Waveform and alphanumeric data is run through the first stage of the pipeline to detect signals and to form preliminary events in automated processing, referred to as station processing. Unlike the processing conducted for the Global pipeline, there is only one interactive analysis stage for Spotlight analysis. The primary goal for the Spotlight analyst is to review, refine, and when possible, augment the event solutions generated by the automated processing.

4-281.   SPOTLIGHT STATION PROCESSING.

4-282.   Spotlight station processing is the first stage of the Spotlight pipeline. Spotlight station processing runs against spotlight seismic station intervals (SPOT) and treats each seismic station in isolation making detections, measurements, and beams according to the properties of the detections themselves. See figure 4-41. In other words, information based on the network about events is not yet available at this stage. Spotlight station processing accomplishes all the processing which can be done at the station level.
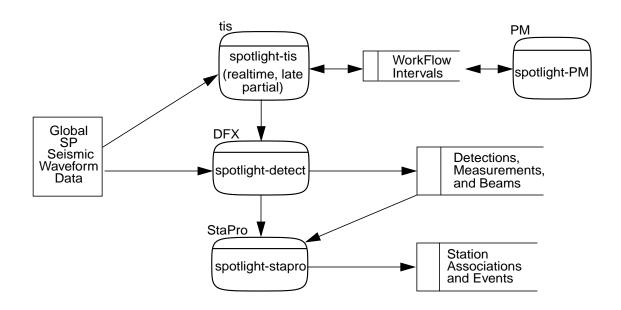
Figure 4-41. Spotlight Station Processing Data Flow Diagram

4-283.   The spotlight-tis-realtime process monitors the incoming raw data in a candidate 15-minute time interval for a station. It creates a SPOT interval with a state of queued in the global database account and initiates processing on the interval when approximately 100 percent of the interval is covered by at least one station channel. If a candidate interval does not become filled to a parameter-determined percentage, but is more than 15 percent filled, then spotlight-tis-realtime creates a partial interval. If the candidate interval does not become at least 15 percent filled, then spotlight-tis-realtime creates a skipped interval.

4-284.   When approximately 10 minutes have elapsed since a partial interval was created, which gives the Data Acquisition Subsystem sufficient time to fill in the time interval, spotlight-tis-partial updates the state of the interval to pending, and spotlight-tis-realtime initiates processing on the interval. If a skipped interval becomes more than 15 percent filled, spotlight-tis-late updates the state of the interval to pending or partial, as appropriate, and spotlight-tis-realtime initiates processing on the interval.

4-285.   The spotlight-PM process schedules and controls the following sequence of processes to be run on each SPOT interval marked queued by the spotlight-tis-realtime process. As the processing is performed, the PM updates the state of the interval to show the current active process in the sequence. When processing is complete, spotlight-PM sets the state of the interval to station-done. If one of the processes fails, then spotlight-PM will attempt to rerun the process. If the process fails a second time, then spotlight-PM will set the state of the interval to failed.
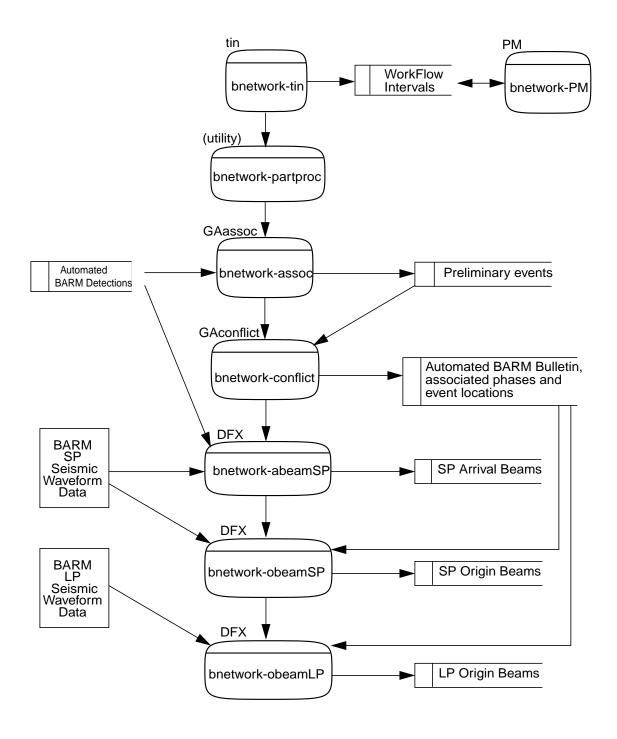
4-286.   The spotlight-detect process creates arrival records for valid signals detected on seismic stations. These records contain information such as the arrival onset time, SNR,

amplitude, and period. It then generates an arrival beam (fk beam) around each arrival, from the available data, to correspond to the feature measurements made on the arrivals.

4-287.   The spotlight-stapro process groups together arrivals for each station which can reasonably be presumed to have a common origin and creates an event (origin) from the association. The grouping together of arrivals is made on the basis of azimuth and slowness for array and three-component sites as well as on the basis of time of arrival for single-component stations.

4-288.   SPOTLIGHT ANALYSIS.

4-289.   Spotlight analysis is the final stage of the Spotlight pipeline. The primary goal in Spotlight analysis is to review and refine the event solutions generated by the automated processing system using all available SP data. See figure 4-42. When Spotlight station processing has completed eight 15-minute intervals, the analyst can begin to process the two-hour block covering the intervals. The analyst starts with a read of the data into ARS, which creates an ARS ral interval. The analyst reviews the events formed by the Spotlight station processing and refines arrival and event data as necessary. When the analyst issues the Save Data command, ARS saves the remaining unassociated arrivals to the ral account.

4-290.   The input to Spotlight analysis is the Automated Bulletin in the regdet database account (accessed through the in_* synonyms in the ral account) and any results which were saved in the ral account during a previous Spotlight analysis session for the same interval or for the adjacent intervals. Information in the ral account regarding a particular event, arrival, etc., takes precedence over the same information found in the regdet account.

4-291.   In Spotlight analysis, event solutions are obtained using a multi-stage iterative procedure during which the origins are refined and augmented by:

   a.   Locating the event.

   b.   Adjusting existing detections (e.g., associate, re-time, rename).

   c.   Adding new detections.

   d.   Relocating the event to include the additional/modified information.

   e.   Verifying the additional/modified information is consistent with the event.
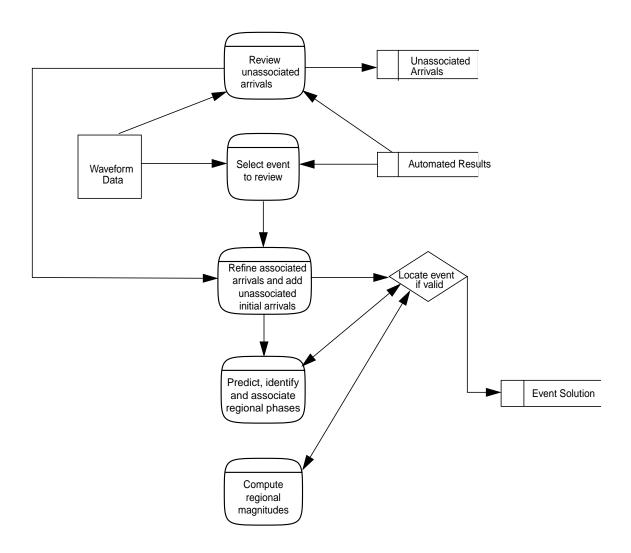
Figure 4-42. Spotlight Analysis Process Flow Diagram

4-292. LOOK-FORWARD PIPELINE.

4-293.   The Look-Forward pipeline transforms raw waveform data into alphanumeric event data in two stages of automated processing and one stage of interactive processing. The purpose of the Look-Forward pipeline is to provide accelerated detection of anticipated events in specified target areas.

4-294.   Waveform and alphanumeric data is run through the first two stages of the pipeline to detect signals and to form preliminary events in automated processing, referred to as station and network processing, respectively. The resulting automated bulletin is then analyzed. Look-Forward analysis differs from other pipelines in that the trial solutions presented to the analyst are not origins defined by a set of arrivals, but instead a set of arrivals which are consistent with an origin in the target region. Look-Forward analysis also

differs from the global pipeline because the automated processing is performed on a subnetwork of stations. The primary goal for the Look-Forward analyst is to determine whether or not the associated detections provided by the automated system define an event which falls within the area of interest, thus, warrants further attention. If the event is validated, the analyst uses stations from the entire global network to refine the solution.

4-295.   LOOK-FORWARD STATION PROCESSING.

4-296.   Look-Forward station processing is the first stage of the Look-Forward pipeline. Look-Forward station processing runs against SEIS and treats each seismic station in isolation, making detections, measurements, and beams according to the properties of the detections themselves. See figure 4-43. In other words, information based on the network about events is not yet available at this stage. Look-Forward station processing accomplishes all processing which can be done at the station level.
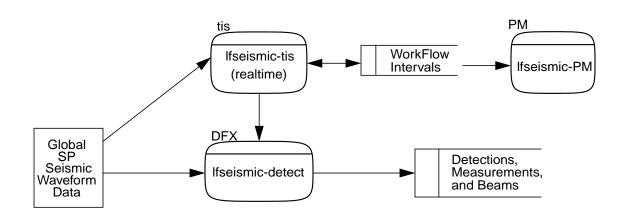
Figure 4-43. Look-Forward Station Processing Data Flow Diagram

4-297.   The lfseismic-tis process monitors the incoming raw data in a candidate 15-minute time interval for a station. It creates an LFSEIS interval with a state of queued in the global database account, and initiates processing on the interval when approximately 80 percent of the interval is covered by at least one station channel. If the candidate interval does not become 80 percent filled, lfseismic-tis creates a skipped interval.

4-298.   The lfseismic-detect process creates arrival records for valid signals detected out of a set of predefined detection beams for the station. It then attempts to generate five-minute arrival beams (fk beams) around each arrival, to correspond to the feature measurements made on the arrivals. When there is not enough waveform data to generate a full five-minute beam, the network processing stage of the global pipeline will generate the arrival beams. For ASN stations, detection processing will normally run against the BB waveform data for

the station. If there are no BB data for an ASN station interval, the detection processing will run against the available SP data instead.

4-299.   LOOK-FORWARD NETWORK PROCESSING.

4-300.   Look-Forward network processing is the second stage of the Look-Forward pipeline. Look-Forward network processing starts every five minutes and runs against the dataset whose endtime is given by the current Look-Forward network interval (LFNET). See figure 4-44. This processing assembles the detection data from the available stations to produce event locations based on multiple stations.

ticron   PM

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┌──────────────┐        ┌──────────────┐        ┌──────────────┐
│ lfnetwork-   │◄──────►│  WorkFlow    │───────►│ lfnetwork-PM │
│  ticron      │        │  Intervals   │        │              │
└──────────────┘        └──────────────┘        └──────────────┘
        │
EvWarning │
        ▼
┌──────────────┐        ┌──────────────┐        ┌──────────────┐
│  Automated   │───────►│ lfnetwork-   │───────►│ Target Events│
│  Target      │        │  evwarning   │        │              │
│  Detections  │        └──────────────┘        └──────────────┘
└──────────────┘            │
           │      DFX       │
           │                ▼
┌──────────────┐        ┌──────────────┐        ┌──────────────┐
│   Global     │───────►│ lfnetwork-   │───────►│ SP Arrival   │
│     SP       │        │  arrbeamSP   │        │   Beams      │
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│    Data      │
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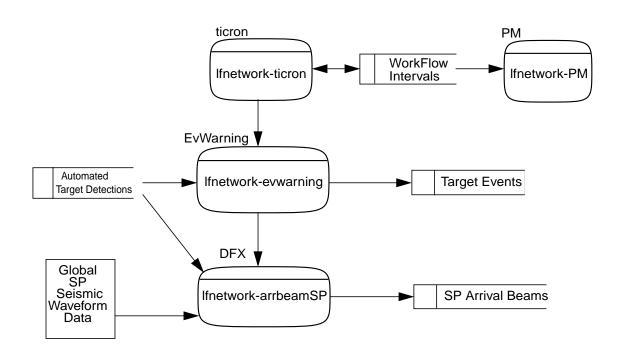
Figure 4-44. Look-Forward Network Processing Data Flow Diagram

4-301.   The lfnetwork-ticron process continuously creates LFNET intervals with a state of queued in the global database account and initiates processing on the intervals. No criteria are used when creating the intervals.

4-302.   The lfnetwork-evwarning process finds arrival associations by comparing new arrivals with pre-defined information for theoretical arrivals from the target. Origins are created when the number of associated arrivals exceeds the minimum number of associated arrivals defined for the target. Email and an audible alarm are sent to the users specified in the file /home/ops/.forward when such an event is evident and accelerated analysis may be performed.

4-303.   The lfnetwork-arrbeamSP process creates arrival beams for arrivals which do not already have beams. In station processing, arrival beams are configured to be five minutes long, and sometimes there may not be enough data to form a beam for a given arrival. The network-arrbeamSP process relaxes the five-minute requirement and creates arrival beams from whatever waveform data is available. Forming some of the arrival beams during network processing allows data acquisition additional time to receive any available data, so potentially a greater percent of the arrival beams will be five minutes long.

4-304.   LOOK-FORWARD ANALYSIS.

4-305.   Look-Forward analysis is the final stage of the Look-Forward pipeline. The primary goal in Look-Forward analysis is to determine if the associated arrivals provided by the automated processing system define a valid event close enough to the original target area to warrant further consideration and analysis. See figure 4-45. The analyst starts by reading data into ARS, which creates an ARS fal interval. The analyst reviews the events formed by network processing and refines arrival and event data as necessary. The Save Data command causes ARS to save the remaining unassociated arrivals to the fal account.
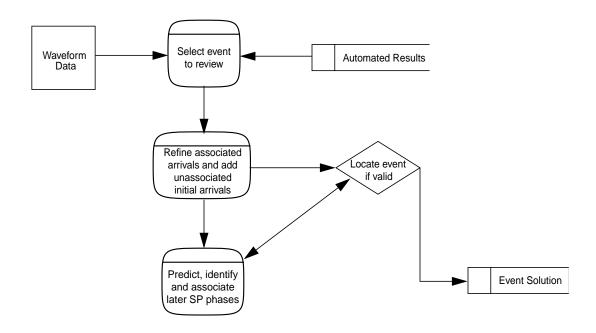
Figure 4-45. Look-Forward Analysis Process Flow Diagram

4-306.   The input to Look-Forward pipeline is the Automated Bulletin in the lfdet database account and any results saved in the fal account during a previous Look-Forward analysis session for the same interval or for the adjacent intervals. Information in the fal account regarding a particular event, arrival, etc., takes precedence over the same information found in the lfdet account.

4-307.   In Look-Forward analysis, event solutions are obtained using a multi-stage iterative procedure to refine and augment origins:

   a.   Locating the event. The automated system provides a solution with the target as the origin epicenter and associated arrivals consistent with an event at the target.

   b.   Locating the event. The automated system provides a solution with the target as the origin epicenter and associated arrivals consistent with an event at the target.

   c.   Adding new detections.

   d.   Relocating the event to include the additional/modified information.

   e.   Verifying the additional/modified information is consistent with the event.

4-308.   HYDROACOUSTIC PIPELINE.

4-309.   The Hydroacoustic pipeline transforms raw waveform data into alphanumeric event data in one stage of automated processing and one stage of interactive processing.

4-310.   HYDROACOUSTIC STATION PROCESSING.

4-311.   Hydroacoustic station processing is the first stage of the Hydroacoustic pipeline. Hydroacoustic station processing runs against hydroacoustic station intervals (HYDR) and treats each station in isolation, making detections and measurements. See figure 4-46. Hydroacoustic station processing accomplishes all the processing which can be done at the station level.
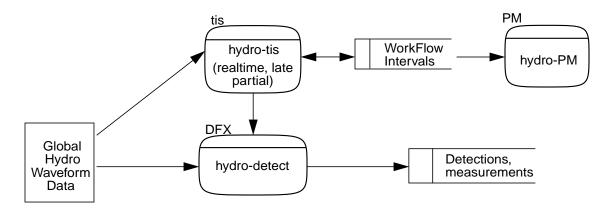
Figure 4-46. Hydroacoustic Station Processing Data Flow Diagram

4-312.   The hydro-detect process creates arrival records for valid signals detected on the station, using a high SNR threshold. There is no beamforming with hydroacoustic processing.

4-313.   HYDROACOUSTIC ANALYSIS.

4-314.   Hydroacoustic analysis (HAL) works with arrivals produced by the automated processing. The automated system does not attempt to associate phases (across the hydroacoustic network) and define origin hypotheses. HAL is performed to review the detections from automated processing, refine the feature measurements for valid signals, modify their phase identification as required, and add signals missed by the automated processing. See figure 4-47.

4-315.   The input to HAL is the Automated Bulletin in the hydrodet database account and any results which were saved in the hal account during a previous HAL session for the same interval or for the adjacent intervals. Information in the hal account regarding a particular event, arrival, etc., takes precedence over the same information found in the lfdet account.
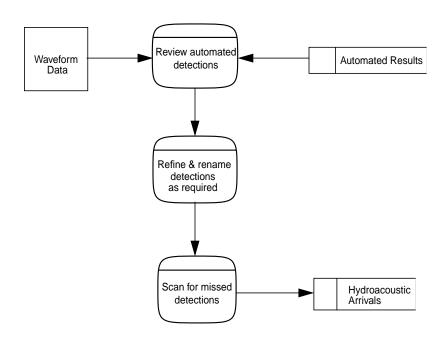
Figure 4-47. Hydroacoustic Analysis Process Flow Diagram

CHAPTER 5

MAINTENANCE

5-1.   INTRODUCTION.

5-2.   Chapter 5 contains information for troubleshooting and maintaining the software and hardware of the United States National Data Center (US NDC). Section I contains the information for routine maintenance, including troubleshooting and software/hardware maintenance routines. Section II provides information for preventive maintenance. Section III contains troubleshooting and maintenance information for use by the System Administrator only.

SECTION I

ROUTINE MAINTENANCE

5-3.   GENERAL.

5-4.   This section discusses the routine maintenance vital to proper operation of the US NDC systems. Operation of the equipment is the responsibility of System Operation and Administration personnel who are expected to define, verify, and record system problems when encountered. Unresolved problems must be reported to maintenance personnel as required by Standard Operating Procedures (SOPs).

5-5.   At the organizational level, maintenance personnel perform tasks outlined in this technical instruction (TI). When a failure is reported by operation personnel, or is discovered by the maintenance technician, the technician isolates the problem to the line replaceable unit (LRU). If the failed item is covered under a maintenance service contract, the commercial contractor is notified and either repairs or replaces the item, or the item is removed and returned to the appropriate maintenance service contractor for repair or replacement. Failed items not under a service contract are removed and replaced by the maintenance technician in accordance with (IAW) procedures outlined in this section or described in referenced service manuals.

5-6.   Depot level maintenance consists of repair of faulty LRUs and is performed by the original equipment manufacturers. Software maintenance is performed by the developmental contractor.

5-7.   TEST EQUIPMENT.

5-8.   Test equipment and special tools required to perform the troubleshooting and repair procedures described in this section are listed in table 1-2.

5-9.   TROUBLESHOOTING PROCEDURES.

<div style="border:1px solid black; display:inline-block; padding:4px">

CAUTION

</div>

Electrostatic Discharge Sensitive (ESDS) devices must be handled with certain precautions, which must be followed to minimize the effect of static build-up. Refer to MIL-STD-1686C and Technical Order (TO) 00-25-234. ESDS devices are identified in this TI by the following symbol:

- - NOTE - -

The technician should be thoroughly familiar with chapter 4 of this manual prior to troubleshooting.

•The technician should be familiar with TI 2-NDC-1 and should be familiar with the operation of the graphic user interface (GUI) tools Launch and WorkFlow.

•During the troubleshooting process, all configuration changes and removal and replacement activities should be documented for traceability purposes.

5-10.   When troubleshooting the US NDC problems, see figure 5-1. If possible, confirm initial fault verification has been performed by system operators. If not, refer to chapter 5 of TI 2-NDC-1 and paragraph 5-18 of this manual.

5-11.   The technician must then determine if the problem/symptom is obviously with the hardware. If not identifiable, refer to chapter 4, chapter 7, or the appropriate source to help identify the problem. Such sources should be used in conjunction with troubleshooting techniques even after the problem is identified.
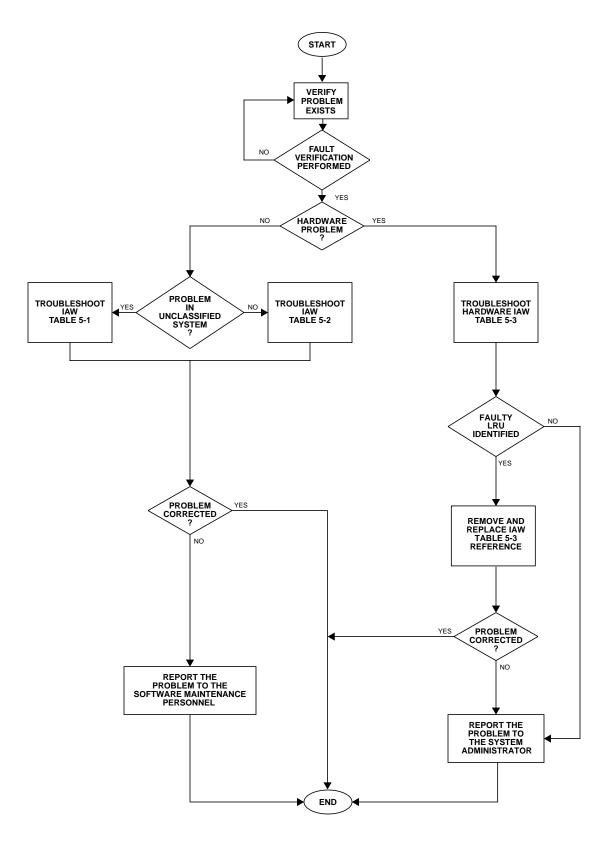
Figure 5-1. General Troubleshooting Flow Chart

5-12. SYSTEM. If the problem is not obviously hardware, the technician should determine if the problem is in the Unclassified System or the Classified System. For Unclassified System problems, refer to table 5-1. For Classified System problems, refer to table 5-2.

5-13. Tables 5-1 and 5-2 list the most probable problems and symptoms which can occur in the US NDC. The problems/symptoms are grouped under the appropriate Unclassified System or Classified System. There is also a section in each table containing general problems/symptoms. Paragraph 5-18 identifies general system troubleshooting checks to be used in conjunction with tables 5-1 and 5-2.

5-14. The second column in tables 5-1 and 5-2 lists possible sources of the problem/symptom, including processes, stations, and the networks.

5-15. The third column in tables 5-1 and 5-2 provides a troubleshooting reference for the corresponding problem and source. For a given problem/symptom, the troubleshooting references listed in the third column should be used in the order they appear.

5-16. HARDWARE. If the problem is with the equipment, the technician should refer to table 5-3 for the troubleshooting references. Table 5-3 will assist the technician in troubleshooting to the LRU level. Paragraph 5-26 identifies general hardware troubleshooting checks to be used in conjunction with table 5-3.

5-17. The first column in table 5-3 lists possible hardware problems/symptoms. The second column lists possible sources of the problem or symptom. The third column provides references to troubleshooting procedures in this manual or to commercial off-the-shelf (COTS) manuals identified by an identifying technical instruction (ITI) number. The fourth column refers to the paragraph in this manual or the appropriate COTS manual for removal and replacement procedures.

Table 5-1. Unclassified System Troubleshooting

PROBLEM/SYMPTOM	POSSIBLE SOURCE OF PROBLEM	TROUBLESHOOTING REFERENCE
General - Unclassified System		
Machine shows red in any Launch window.	Machine is not running or is inaccessible.	Perform paragraph 5-31.
	Launchd process will not start because sockd process is not running.	Perform paragraph 5-33.
Machine shows burgundy in any Launch window.	User does not belong to the ops group.	Perform paragraph 5-35.
Process block is red in any Launch window.	Process is not running.	Perform paragraph 5-37.
Process cannot be started from any Launch window.	User does not belong to the ops group.	Perform paragraph 5-35.
Machine(s) not in sync.	xntpd not running.	Contact System Administration.
Unclassified Data Acquisition Subsystem		
DA WorkFlow indicates all stations have stopped acquiring.	Database is hung.	Perform paragraph 5-39.
	Update interval process is hung.	Perform paragraph 5-41.
DA WorkFlow indicates multiple stations have stopped acquiring at about the same time.	Data source or diskloop machine problem.	Perform paragraph 5-52.
DA WorkFlow indicates single station outage.	Single station outage.	Perform paragraph 5-54.
	AlphaForward process to DLMan process connection.	Perform paragraph 5-49.
The IDC intervals in the DA WorkFlow are missing or behind real-time by more than three hours.	Not receiving ascii_workflow e-mail from the IDC.	Perform paragraph 5-62.

Table 5-1. Unclassified System Troubleshooting (Cont)

PROBLEM/SYMPTOM	POSSIBLE SOURCE OF PROBLEM	TROUBLESHOOTING REFERENCE
Unclassified Archive Subsystem		
One or more intervals in Archive WorkFlow are red and have the state archlong-failed.	ArchiveLongTerm encountered a database or file system error.	Perform paragraph 5-43.
One or more intervals in Archive WorkFlow are red and have the state archperm-failed.	ArchivePermanent encountered a database or file system error.	Perform paragraph 5-45.
The most recent intervals in Archive WorkFlow are missing or blue more than four hours behind real-time.	ArchiveLongTerm is waiting for disk space in `/data/archive`.	Perform paragraph 5-47.

Table 5-2. Classified System Troubleshooting

PROBLEM/SYMPTOM	POSSIBLE SOURCE OF PROBLEM	TROUBLESHOOTING REFERENCE
General - Classified System		
Machine shows red in any Launch window.	Machine is not running or is inaccessible.	Perform paragraph 5-31.
	Launchd will not start because sockd process is not running.	Perform paragraph 5-33.
One machine is locked up or is inaccessible.	Machine is locked up or is inaccessible.	Perform paragraph 5-31.
Multiple machines are locked up or are inaccessible.	Multiple machines are locked up or are inaccessible.	Perform paragraph 5-31.
Machine shows burgundy in any Launch window.	User does not belong to the ops group.	Perform paragraph 5-35.
Process shows red (stopped) in Launch window.	Process is not running.	Perform paragraph 5-37.
Process cannot be started from Launch window.	User does not belong to the ops group.	Perform paragraph 5-35.
Machine(s) not in sync.	xntpd not running.	Call System Administration.
Classified Data Acquisition Subsystem		
DA WorkFlow indicates a single station outage.	Classified Hydro station.	Perform paragraph 5-54.
	Unclassified Data Acquisition Subsystem.	Perform paragraph 5-70.
	AlphaForward process to DLMan process connection.	Perform paragraph 5-49.
DA WorkFlow indicates all stations have stopped acquiring data.	Database hung or not running.	Perform paragraph 5-39.
	Update Interval process is hung.	Perform paragraph 5-41.

Table 5-2. Classified System Troubleshooting (Cont)

PROBLEM/SYMPTOM	POSSIBLE SOURCE OF PROBLEM	TROUBLESHOOTING REFERENCE
Classified Archive Subsystem		
DA WorkFlow shows all unclassified stations have stopped acquiring.	DiodeToAlpha process is hung or not running.	Perform paragraph 5-72.
	Diode Receive process is hung or not running.	Perform paragraph 5-74.
	RT Reader process is not running or is listening to the wrong side.	Perform paragraph 5-76.
	Diode Send process is hung or not running.	Perform paragraph 5-78.
	Secure Diode link down.	Perform paragraph 5-80.
One or more intervals in Archive WorkFlow are red and have the state archlong-failed.	ArchiveLongTerm encountered a database or file system error.	Perform paragraph 5-43.
One or more intervals in Archive WorkFlow are red and have the state archperm-failed.	ArchivePermanent encountered a database or file system error.	Perform paragraph 5-45.
The most recent intervals in Archive WorkFlow are missing or blue more than four hours behind real-time.	ArchiveLongTerm is waiting for disk space in `/data/archive`.	Perform paragraph 5-47.

Table 5-3. General Hardware Troubleshooting

PROBLEM	POSSIBLE SOURCE OF PROBLEM	TROUBLESHOOTING REFERENCE	REMOVAL AND REPLACEMENT REFERENCE
AC Power Indicators are OFF	Power Cord	Perform paragraph 5-28.	Perform paragraph 5-82.
	Power Center	Perform paragraph 5-29.	Perform paragraph 5-83.
Display	Monitor (17" and 20")	Refer to ITI 2WS-SUN/CM/ 17/20-1.	Refer to associated processor manual.
	Monitor (21")	Refer to ITI 2WS-SUN/CM/ 21-1.	Refer to associated processor manual.
	Video Card	Refer to associated processor manual.	Refer to associated processor manual.
	Monitor Cable	Refer to ITI 2WS-SUN/CM/ 17/20-1 or ITI 2WS-SUN/ CM/21-1.	Refer to associated processor manual.
Keyboard	Keyboard	Refer to ITI 2WS-SUN/KB5-11.	Refer to ITI 2WS-SUN/KB5-11.
Mouse	Mouse	Refer to ITI 2WS-SUN/KB5-11.	Refer to ITI 2WS-SUN/KB5-11.
Secure Diode Link	Fiber Cable	Perform paragraph 5-80.	Perform paragraph 5-84.
	Ethernet Transceiver	Perform paragraph 5-80.	Perform paragraph 5-85.
	Universal Mini-Media Converter	Perform paragraph 5-80.	Perform paragraph 5-85.
Ultra 1 Creator Workstation	Internal components	Refer to ITI 2WS-ULTRA1-2.	For pipeline processors, perform paragraph 5-86. For all others, perform paragraph 5-87.
Ultra 5 Creator Workstation	Internal components	Refer to ITI 2WS-ULTRA5/ 10-2.	Perform paragraph 5-88.
	8mm Tape Drive	Refer to ITI 2WS-8MMTD/ DSM-1.	Perform paragraph 5-88.
Ultra 10 Workstation	Internal components	Refer to ITI 2WS-ULTRA5/ 10-2.	Perform paragraph 5-89.

Table 5-3. General Hardware Troubleshooting (Cont)

PROBLEM	POSSIBLE SOURCE OF PROBLEM	TROUBLESHOOTING REFERENCE	REMOVAL AND REPLACEMENT REFERENCE
SPARCstation 10	Internal components	Refer to ITI 2WS-SPARC10-1.	Perform paragraph 5-90.
	SPARCstorage MultiPack	Refer to ITI 2WS-SPARC/MP-1 & ITI 2WS-SPARC/MP-7.	Perform paragraph 5-90.
Ultra Enterprise 450 Server (Pipeline Processor only)	Internal components	Refer to ITI 2WS-ULTRA/E450-1.	Perform paragraph 5-86.
Ultra Enterprise 450 Server (Diskloop Server only)	Internal components	Refer to ITI 2WS-ULTRA/E450-1.	Perform paragraph 5-91.
Ultra Enterprise 450 Server (Unclassified Archive/Database Server only)	Internal components	Refer to ITI 2WS-ULTRA/E450-1.	Perform paragraph 5-92.
	DLT StorEdge L3500 Library	Refer to ITI 2WS-DLT/L3500-1.	Perform paragraph 5-92.
Ultra Enterprise 450 Server (Classified Archive/Database Server only)	Internal components	Refer to ITI 2WS-ULTRA/E450-1.	Perform paragraph 5-93.
	StorEdge L280 Tape Library	Refer to ITI 2WS-DLT/L280-1.	Perform paragraph 5-93.
	External Tape Drive	Refer to ITI 2WS-SPARC/DLT-7000-1.	Perform paragraph 5-93.
Ultra Enterprise 4000 (Waveform Server only)	Internal components	Refer to ITI 2WS-ULTRA/E4000-1.	Perform paragraph 5-94.
	StorEdge A3500	Refer to ITI 2WS-RAID/A3500/CM-1 & ITI 2WS-RAID/A3500-1.	Perform paragraph 5-94.
	StorEdge D1000	Refer to ITI 2WS-DA/X1000-1 & ITI 2WS-DA/D1000-8.	Perform paragraph 5-94.
	RAID Manager 6.22	Refer to ITI 2WS-RAID/6.22-1, ITI 2WS-RAID/6.22-7 and ITI 2WS-RAID/6.22-11.	Perform paragraph 5-94.
	SPARCstorage MultiPack	Refer to ITI 2WS-SPARC/MP-1 & ITI 2WS-SPARC/MP-7.	Perform paragraph 5-94.

Table 5-3. General Hardware Troubleshooting (Cont)

PROBLEM	POSSIBLE SOURCE OF PROBLEM	TROUBLESHOOTING REFERENCE	REMOVAL AND REPLACEMENT REFERENCE
Ultra Enterprise 4000 (Pipeline DB Server only)	Internal components	Refer to ITI 2WS-ULTRA/ E4000-1.	Perform paragraph 5-95.
	SPARCstorage MultiPack	Refer to ITI 2WS-SPARC/ MP-1 & ITI SPARC/MP-7.	Perform paragraph 5-95.
	SPARCstorage MultiPack 2	Refer to ITI 2WS-SPARC/ MP2-2.	Perform paragraph 5-95.
	External Tape Drive	Refer to ITI 2WS-SPARC/ DLT-7000-1.	Perform paragraph 5-95.
Console Switch	Console Switch, 12-port	Refer to ITI 2SE-SWITCH/ KV5200-1	Perform paragraph 5-96.
Optra S Laser Printer	Printer	Refer to ITI 2WS-PRNTR/ OPTRAS-1 & ITI 2WS-PRNTR/NA-7.	Perform paragraph 5-97.

5-18.   GENERAL TROUBLESHOOTING PROCEDURES.

5-19.   GENERAL SYSTEM TROUBLESHOOTING.

5-20.   The following procedure should be used to troubleshoot the problems or symptoms listed in table 5-1 and table 5-2.

        a.   Check process status indicators for abnormal conditions. Refer to controls and indicators in TI 2-NDC-1, chapter 3.

        b.   Check application-level log files for affected processes IAW paragraph 5-21.

        c.   Check application-level process lists IAW paragraph 5-22.

        d.   Check swap space utilization IAW paragraph 5-23.

        e.   Check disk partition usage IAW paragraph 5-24.

        f.   Check system-level log files IAW paragraph 5-25.

        g.   Check system-level process lists IAW paragraph 5-22.

5-21.   REVIEW APPLICATION LEVEL LOG FILES.

      a.   If application log file can be viewed from Launch window:

        (1)   Place cursor over process indicator in appropriate Launch window and right-click on mouse.

        (2)   Select **Monitor** from drop-down menu.

        (3)   Review application log file for errors.

        (4)   Take appropriate action as defined by error message, or notify software maintenance.

        (5)   For Oracle errors, notify database administration. The following is an example of an Oracle error:

```
ORA-00255 error occurred during archival of log 'logfile', sequence
####
```

      b.   If application log file cannot be viewed from Launch window:

        (1)   Refer to appendix 3 for log file location.

        (2)   Review application log file for errors by typing:

more <log file location> (Where <log file location> = log file location listed in appendix 3)

        (3)   Take appropriate action as defined by error message, or notify software maintenance.

        (4)   For Oracle errors, notify database administration. The following is an example of an Oracle error:

```
ORA-00255 error occurred during archival of log 'logfile', sequence
####
```

5-22.   PROCESS MAINTENANCE.

      a.   To list processes, type:

ps -ef | grep <account name>↵ (Where <account name> = account which started the process; e.g., oper1, analyst1)

b.   Look for process or processes using excessive memory or central processing unit (CPU) time.

c.   If there are any redundant process or processes using excessive memory or CPU time, kill and restart the process.

d.   If process cannot be killed from GUI, kill process by typing:

`kill -9 <pid>`↵ (Where <pid>= unique process identification number)

5-23.   SWAP SPACE UTILIZATION.

a.   To check swap space, type:

`swap -s`↵

b.   If swap space usage is 85% or higher, exit session and log back in.

5-24.   DISK PARTITION CHECK.

a.   To check disk partition usage, type:

`df -k`↵

b.   Occasionally a partition will become unmounted. If this occurs, reboot machine.

c.   Other than the `/usr` partition, partitions at 100% capacity or greater need to be corrected.

(1)   If root partition is full, notify system administration.

(2)   For all other partitions, delete unnecessary files. If unsure as to which files to delete, notify system administration.

5-25.   SYSTEM LEVEL LOG FILES.

a.   Review system-level log files by typing:

`more <log file>` (Where <log file> = `/var/adm/messages` or `/var/log/syslog`)

b.   For error messages, take appropriate action in accordance with applicable ITI.

5-26.   GENERAL HARDWARE TROUBLESHOOTING.

5-27.   The following procedure should be used as an initial step in troubleshooting all hardware components.

a.   Visually inspect the equipment. Refer to appropriate equipment ITI as required.

(1)   Check power.

(2)   Check cables and connectors.

(3)   Check switch settings.

(4)   Check indicators.

b.   Check for on-going or recent maintenance actions.

c.   Check machine operation by remote login from Console Switch. Perform paragraph 5-20. d. through 5-20. f.

d.   Verify connectivity with LAN/WAN point of contact (POC).

e.   Refer to table 5-3 for hardware troubleshooting references.

5-28.   POWER CORD TROUBLESHOOTING PROCEDURE.

a.   Verify assembly power switch is turned ON.

b.   If connected to a power center, verify power center is turned ON.

c.   Visually inspect power cord for physical damage.

d.   If necessary, remove and replace IAW table 5-3.

5-29.   POWER CENTER TROUBLESHOOTING PROCEDURE.

a.   Verify power distribution center circuit breaker is ON.

b.   Verify power center switch is turned ON.

c.   Verify surge protector is not tripped.

d.   If power is still not available, remove and replace power center IAW table 5-3.

5-30. TROUBLESHOOTING PROCEDURES COMMON TO BOTH THE UNCLASSIFIED AND CLASSIFIED SYSTEMS.

5-31.   MACHINE IS NOT RUNNING OR IS INACCESSIBLE.

5-32.   To determine if a machine is not running or is inaccessible, proceed as follows:

      a.   From an xterm window, ping suspect machine by typing:

`ping <machine name>`↵ (Where <machine name> = name of suspect machine)

      b.   If result from ping is `no answer from <machine name>`, refer to paragraph 5-26 for continued troubleshooting.

      c.   If result from ping is `<machine name> is alive`, attempt a remote login to the suspect machine by typing:

`rlogin <machine name>`↵ (Where <machine name> = name of suspect machine)

      d.   If response from rlogin was `Unable to connect to host` or `Connection refused`, notify system administration that an rlogin to suspect machine failed.

      e.   If rlogin was successful, at prompt type:

`uname -n`↵

      f.   If response from uname command is `<machine name>`, the machine is running; contact software maintenance.

      g.   If response from uname command was NOT `<machine name>`, the machine failed.

- - NOTE - -

Do not attempt to reboot dlsa, uarch, cdbsa, and carch without notifying database administration.

      h.   Shut down/power off suspect machine IAW shutdown/power off procedure in chapter 3.

      i.   Perform startup procedure in chapter 2 for suspect machine.

      j.   If machine is still not running or is still inaccessible, notify system administration.

5-33.   LAUNCHD WILL NOT START BECAUSE SOCKD PROCESS IS NOT RUNNING.

5-34.   To determine if a sockd process is running, proceed as follows:

a.   Remote login to suspect machine by typing:

`rlogin <machine name>`↵ (Where <machine name> = name of suspect machine)

b.   Determine if sockd process is running by typing:

`ps -ef | grep -v grep | grep sockd | grep -v ConnMan`↵

c.   If there is an output, sockd process is running. Notify software maintenance.

d.   If there is no output, sockd process is NOT running. In Launch window, **Start Launchd** for suspect machine.

e.   If suspect machine indicator block does not turn green, notify software maintenance.

5-35.   USER DOES NOT BELONG TO THE OPS GROUP.

5-36.   To determine if a user belongs to the ops group, proceed as follows:

a.   In an xterm window, display the group membership of the user running Launch by typing:

`groups <user>`↵ (Where <user> = user's login name)

b.   If list of groups displayed does not contain ops, notify system administration.

c.   If list of groups displayed does contain ops, notify software maintenance.

5-37.   PROCESS IS NOT RUNNING.

5-38.   If a process shows red in Launch window, proceed as follows:

a.   To restart process, right-click on stopped process indicator block and select **Start**.

b.   If process starts, **Monitor** application log files to verify operation.

c.   If process stops again after being re-started, notify software maintenance.

5-39.   DATABASE IS HUNG.

5-40.   To determine if database is hung, proceed as follows:

      a.   Open an xterm window and connect to suspect database by typing:

`sqlplus global/<password>@OPSDB`↵ (Where <password> = global account pass-word)

      b.   If there are any Oracle errors (`ERROR:  ORA`) shown, report problem to database administration for correction.

      c.   If there are no errors, database is working properly. At SQL prompt, type:

`quit`↵

      d.   Continue troubleshooting IAW tables 5-1 and 5-2.

5-41.   UPDATE INTERVAL PROCESS IS HUNG.

5-42.   To determine if Update Interval process is hung, proceed as follows:

      a.   In Data Acquisition Launch window, **Monitor** Update Interval process.

      b.   If last log message has a current time stamp, Update Interval process is not hung. Contact software maintenance.

      c.   If time stamp on last log message is more than five minutes old, the process is hung. **Stop** Update Interval process.

      d.   If process does not stop in one minute, **Kill** then re-**Start** process.

      e.   If a new log message appears with a current stamp, Update Interval process is no longer hung.

      f.   If there are errors or process fails to start, notify software maintenance.

5-43.   ARCHIVELONGTERM ENCOUNTERED DATABASE OR FILESYSTEM ERROR.

5-44.   To determine if Archive WorkFlow intervals with the state archlong-failed (database or filesystem error) can now be successfully archived, proceed as follows:

- - NOTE - -

If there are any other problems/symptoms which are seen outside the Archive WorkFlow window, first troubleshoot them IAW tables 5-1 and 5-2.

a.   In Archive WorkFlow window, select **View**⇒**Exception**.

b.   Right-click on each red interval in Exception Intervals window with the state archlong-failed and select **Update Interval State** from menu.

c.   If after one hour, there are new red intervals with a state of archlong-failed in Exception Intervals window, report problem to software maintenance.

d.   If there are no new red intervals with a state of archlong-failed in Exception Intervals window, there is no longer a problem affecting the process ArchiveLongTerm.

5-45.   ARCHIVEPERMANENT ENCOUNTERED DATABASE OR FILESYSTEM ERROR.

5-46.   To determine if Archive WorkFlow intervals with the state archperm-failed (database or filesystem error) can now be successfully archived, proceed as follows:

- - NOTE - -

If there are any other problems/symptoms which are seen outside the Archive WorkFlow window, first troubleshoot them IAW tables 5-1 and 5-2.

a.   Select **View**⇒**Exception** in the Archive WorkFlow window.

b.   Red intervals with a state of archperm-failed observed in Exception Intervals window should automatically resolve within one hour without operator intervention. After one hour, if there are still red intervals with a state of archperm-failed in Exception Intervals window, report problem to software maintenance.

c.   If there are no red intervals with a state of archlong-failed in Exception Intervals window, there is no longer a problem affecting the ArchivePermanent process.

5-47.   ARCHIVELONGTERM IS WAITING FOR DISK SPACE.

5-48.   To determine if ArchiveLongTerm process is waiting for disk space to become available, proceed as follows:

a.   From Archive Launch window, **Start** all ArchiveClean, ArchivePermanent, and ArchiveLongTerm processes which are blue.

b. **Monitor** ArchiveLongTerm process.

c. If content of window changes at least once every 60 seconds, the process is not waiting for disk space. Wait up to 60 minutes for Archive WorkFlow to begin catching up to real-time, and if no improvement is seen after 60 minutes, notify software maintenance.

d. If content of window does not change for more than 60 seconds, then ArchiveLongTerm process may be waiting for disk space.

e. **Monitor** ArchiveClean and ArchivePermanent processes on the Unclassified System, and ArchivePermanent process on the Classified System.

f. If timestamp on last log message of both processes is less than 60 minutes old, notify software maintenance.

g. If timestamp on last log message of either process is more than 60 minutes old, **Stop** and re-**Start** process.

h. Wait up to 60 minutes for Archive WorkFlow to begin catching up to real-time. Expect older blue intervals to be archived (i.e., turn to green) first. If no archiving is seen after 60 minutes, notify software maintenance.

5-49. ALPHAFORWARD TO DLMAN CONNECTION.

5-50. To determine if AlphaForward process is having problems connecting to DLMan process, proceed as follows:

a. In an xterm window, display the forward file id (fwfid) of AlphaForward process handling suspect station by typing:

station where <STA>↵ (Where <STA> = name of station)

b. From DA Launch window, **Monitor** appropriate AlphaForward log file (e.g., if fwfid was 3 then appropriate AlphaForward would be `AlphaForward3`).

(1) If log file indicates AlphaForward is forwarding data, the connection to DLMan is functioning properly. If single station outage continues, contact software maintenance.

(2) If the AlphaForward log shows "`Error sending.....`" for some or all stations, there is a problem with DLMan. Stop and restart DLMan.

(a) If errors continue, contact software maintenance.

(b) If there are no errors, connection is working. If the single station outage continues, contact software maintenance.

(3) If the AlphaForward log shows "`Nothing sent in last buffer check`" and "`sleeping 15 before next service`" continuously, contact software maintenance.

(4) If any other error message is displayed in the log, contact software maintenance.

5-51.   UNCLASSIFIED DATA ACQUISITION TROUBLESHOOTING PROCEDURES.

5-52.   DATA SOURCE OR DISKLOOP MACHINE PROBLEM.

5-53.   To determine the cause of a multi-station outage, proceed as follows:

a. Open an xterm window, and determine source for each station which has stopped acquiring by typing:

`station where <STA LIST>↵` (Where <STA LIST>= list of all stations which are out)

b. If multi-station outage is attributed to a single source (e.g., ADSN, ASN, IDC), proceed to paragraph 5-64.

c. To determine if data acquisition is the cause of multi-station outage, perform the following procedure:

(1) In Data Acquisition Launch window, **Monitor** DLMan process running.

(2) If there is logging activity within one minute, DLMan processes are working.

(a) If there are errors in the logging output, notify software maintenance.

(b) If there are NO errors, resume monitoring DA WorkFlow.

(3) If there is NO logging activity within one minute, that DLMan process is hung.

(a) **Stop** all DLMan processes.

(b) **Kill** any DLMan process which does not stop in one minute. If Kill is used on a DLMan process, then also **Stop** AlphaDLHeap and ConnMan sockd processes.

(c) **Start** any stopped DLMan process.

(d) **Start** any AlphaDLHeap and ConnMan sockd processes which were stopped.

(4)   If DA WorkFlow does not show station acquisition within five minutes, notify software maintenance.

d.   If multi-station outage is not attributed to a single source, continue troubleshooting each station as a single station outage IAW paragraph 5-54.

5-54.   SINGLE STATION OUTAGE.

5-55.   To determine cause of a station outage, proceed as follows:

a.   Open an xterm window and display information about the station by typing:

`station where <STA>`↵ (Where <STA> = name of station)

b.   The station input type is listed on third line of output directly after the word `Type`: and will be either `ALPHA`, `DTC`, or `FILE`.   The connection status is located on fourth line of the output and will be either `Station not connected` for a station not connected or `Source host`: for a station connected. The `Prefdlid`: (Preferred DLMan processor) and `Dlid`: (Actual DLMan processor) are also located on fourth line.

c.   Perform procedure given below for input type obtained from paragraph 5-55. b.

INPUT TYPE	PROCEDURE
ALPHA	Perform paragraph 5-56.
FILE	Perform paragraph 5-58.
DTC	Perform paragraph 5-60.

d.   If cause of station outage could not be determined after performing appropriate procedures, report station outage to software maintenance.

5-56.   SINGLE STATION OUTAGE (INPUT TYPE = ALPHA).

5-57.   To determine cause of a station outage for ALPHA input type stations, proceed as follows:

a.   If the station in question is connected, in Data Acquisition Launch window, **Monitor** actual DLMan process (Dlid) responsible for processing station data.

(1)   If there are any errors for that station, notify software maintenance.

(2)   If there are no errors, notify source station POC. If source station POC cannot resolve problem, notify software maintenance.

b.   If station in question is NOT connected, in Data Acquisition Launch window, **Monitor** preferred DLMan process (Prefdlid) responsible for processing station data.

c.   If error `new format inconsistent with conversion specification, sta <STA> WARNING - format unacceptable, sta <STA> dropped` appears, notify software maintenance.

d.   To determine if ConnMan is refusing station connection attempts, in Data Acquisition Launch window, **Monitor** ConnMan process.

e.   If station is repeatedly trying to connect, notify software maintenance.

f.   If `ConnMan FATAL - no match for sta/addr <STA>/ xxx.xxx.xx.xxx in global/.......@OPSA` appears, notify database administration.

g.   If there are no new logging entries for `<STA>` in output log, problem may be with communication link between US NDC and station's source. Determine Internet Protocol (IP) address of station's source machine by typing:

```
sqlplus 'readpar -f $DB_PAR GLOBALDB'↵
SQL> select sta, address from alphasite↵
  2> where address not like '192.239.137.%'↵
  3> and sta = '<STA>'; (Where <STA> = station's name)
SQL> exit↵
```

h.   Ping station's source machine by typing:

`/opt/local/bin/traceroute<address>`↵ (Where <address> = IP address)

i.   If, after one or more lines of output, traceroute returns to the system prompt, communications link to station's source is okay. Notify station POC.

j.   If the last line of the response from traceroute is <line number> * * * (where line number is an integer number), there is a problem with the communication link between the station's source machine and the US NDC. Press **<Control>c** to terminate traceroute. Notify communication provider(s). The line prior to the line with the asterisks identifies the IP address of the last communication link which could be reached.

5-58.   SINGLE STATION OUTAGE (INPUT TYPE = FILE).

5-59.   To determine cause of a station outage for FILE input type stations, proceed as follows:

a.   In Data Acquisition Launch window, **Monitor** station's file2alpha process.

b.   If time stamp on log file is more than five minutes old, **Stop** and re-**Start** file2alpha process.

c.   If there are errors, report problem to software maintenance.

d.   If the DA WorkFlow does not show the station acquiring data within five minutes, troubleshoot the station IAW TI 2-ADSN/HQ/SATN-2.

5-60.   SINGLE STATION OUTAGE (INPUT TYPE = DTC).

5-61.   To determine cause of a station outage for DTC input type stations, proceed as follows:

a.   In the Data Acquisition Launch window, **Monitor** the station's dtc2alpha process. Table 5-4 identifies each station's dtc2alpha process.

Table 5-4. Station dtc2alpha Process Reference

STATION	DTC2ALPHA
ALAR	dtc2alpha460
AUAR	dtc2alpha421
BCAR	dtc2alpha460
BMAR	dtc2alpha460
BRAR, BRLAR	dtc2alpha301
CBAR	dtc2alpha079
CMAR	dtc2alpha415
FLAR	dtc2alpha244
ILAR	dtc2alpha460
IMAR	dtc2alpha460
KSAR	dtc2alpha452
SOAR	dtc2alpha313
TT	dtc2alpha460

b.   If there are any error messages, **Stop** and re-**Start** appropriate dtc2alpha process.

c.   If the message **** TAKING A NAP FOR NN SECONDS**** appears repeatedly, troubleshoot IAW TI 2-ADSN/HQ/SATN-2.

d.   If there are any other error messages, notify software maintenance.

e.   If DA WorkFlow does not show the station acquiring data within five minutes, troubleshoot station IAW TI 2-ADSN/HQ/SATN-2.

5-62.   NOT RECEIVING ASCII_WORKFLOW E-MAIL FROM THE IDC.

5-63.   To determine if ascii_workflow e-mail is being received from IDC, proceed as follows:

a.   In an xterm window, remote login to dlsa by typing:

rlogin dlsa↵

b.   Change current working directory to ascii_workflow directory by typing:

cd /data/dlsa/data4/ascii_workflow↵

c.   List most recently arrived ascii_workflow file by typing:

ls -Flatr *.* | tail -1↵

d.   List last ten files with the latest information by typing:

ls -Fla *.* | tail -10↵

e.   If file listed in paragraph 5-63. c. is not the same as last file listed in paragraph 5-63. d., at least one ascii_workflow e-mail message has arrived out of order. This is a temporary condition which will remedy itself.

f.   Display system time by typing:

date -u↵

g.   If system time is more than fourteen hours ahead of most recent JDATE.FILETIME listed (see figure 5-2), there is a problem receiving the IDC's ascii_workflow e-mail.

h.   Notify IDC to verify ascii_workflow e-mail is being sent.

i.   If IDC is sending ascii_workflow e-mail, report problem to system administration.

j.   If IDC is not sending ascii_workflow e-mail, wait until IDC resolves problem.

```
-r--r--r-- 1 ops    data    6137    Feb 10    16:00    2000041.040000
                                     DAY       TIME     JDATE.FILETIME
```

Figure 5-2. Sample Output

5-64.   SINGLE SOURCE MULTI-STATION OUTAGE.

a.   In an xterm window, display the time of last DLMan activity for all stations from the source in question by typing:

station last -d all <SRC>↵ (Where <SRC> = name of source in question (i.e., ADSN, ASN, IDC, and others)).

b.   If the most recent time of ALL stations listed is more than 15 minutes behind real-time, there is a problem at the source or with the connection between the source and the US NDC. Continue troubleshooting as follows:

(1)   For ADSN source stations, perform paragraph 5-65.

(2)   For ASN source stations, perform paragraph 5-66.

(3)   For IDC source stations, perform paragraph 5-67.

(4)   For all other multi-source stations, perform paragraph 5-68.

5-65.   For ADSN source stations, proceed as follows:

a.   From an xterm window, determine if connection between ADSN system and US NDC is alive by typing:

ping adsn-gw↵

b.   If response from the ping is adsn-gw is alive, proceed as follows:

(1)   In Data Acquisition Launch window, **Monitor** dtc2alpha process for each ADSN station.

(2)   If log file output shows failed DTC connections, **Stop** and re-**Start** dtc2alpha processes.

(3)   If there are other error messages, report problem to software maintenance.

(4)   If stopping and restarting dtc2alpha processes did not restore data acquisition, there is a problem with the ADSN system. Troubleshoot IAW TI 2-ADSN/HQ/SATN-2.

c.   If response from ping is NOT `adsn-gw is alive`, there is a problem with connection between ADSN machine dcol3 and US NDC. Report problem to network administration.

5-66.   For ASN source stations, proceed as follow:

a.   From an xterm window, determine if connection between ASN machine amazon and US NDC is alive by typing:

`ping ASNhost`↵

b.   If response from ping is `ASNhost is alive`, proceed as follows:

(1)   In Data Acquisition Launch window, **Monitor** file2alpha process for each ASN station.

(2)   **Stop** and re-**Start** any file2alpha processes which have time stamps more than five minutes old in their log file.

(3)   If there are error messages, report problem to software maintenance.

(4)   If Data Acquisition WorkFlow does not show the station acquiring in five minutes, **Monitor** feed_file2alpha and ASN Receive processes in Data Acquisition Launch Window.

(5)   If time stamp on feed_file2alpha process log file is more than five minutes old, **Stop** and re-**Start** both feed_file2alpha and ASN Receive processes.

(6)   If there are error messages, report problem to software maintenance.

(7)   If DA WorkFlow does not show the station acquiring in five minutes, troubleshoot ASN outage IAW TI 2-ADSN/HQ/SATN-2.

c.   If response from ping is NOT `ASNhost is alive`, there is a problem with connection between ASN machine amazon and US NDC. Report problem to network administration.

5-67.   For IDC source stations, proceed as follow:

        a.   In Data Acquisition Launch window, **Monitor** ConnMan process.

        b.   If IDC stations are repeatedly trying to connect, notify software maintenance.

        c.   If IDC stations are NOT attempting to connect, open an xterm window and determine if communications link to the Global Communication Interface (GCI) is alive by typing:

`/opt/local/bin/traceroute<address>`↵ (Where <address> = IP address)

        d.   If, after one or more lines of output, traceroute returns to the system prompt, communications link to the GCI is okay. Notify station IDC POC.

        e.   If the last line of the response from traceroute is <line number> * * * (where <line number> = an integer number), there is a problem with the communication link between the IDC's source machine and the US NDC. Press **<Control>c** to terminate traceroute. The line prior to the line with the asterisks identifies the IP address of the last communication link which could be reached. Notify communication provider(s).

5-68.   For multi-station sources other than ADSN, ASN, and IDC, proceed as follows:

        a.   In Data Acquisition Launch window, **Monitor** ConnMan process.

        b.   If other stations of the same source are repeatedly trying to connect, notify software maintenance.

        c.   If other stations of the same source are NOT attempting to connect, open an xterm window and determine if communication link between stations and US NDC is alive by typing:

`/opt/local/bin/traceroute<address>`↵ (Where <address> = IP address)

        d.   If, after one or more lines of output, traceroute returns to the system prompt, communications link to station's source is okay. Notify station POC.

        e.   If the last line of the response from traceroute is <line number> * * * (where line number is an integer number), there is a problem with the communication link between the station's source machine and the US NDC. Press **<Control>c** to terminate traceroute. The line prior to the line with the asterisks identifies the IP address of the last communication link which could be reached. Notify communication provider(s).

5-69.   CLASSIFIED DATA ACQUISITION TROUBLESHOOTING PROCEDURES.

5-70.   UNCLASSIFIED DATA ACQUISITION SUBSYSTEM DATA PROBLEM.

5-71.   To determine if a station outage is also being experienced on the Unclassified Data Acquisition Subsystem, perform the following:

a.   If station outage also appears in the unclassified DA WorkFlow window, go to paragraph 5-54.

b.   If no problem is indicated in the unclassified DA WorkFlow window, report problem to software maintenance.

5-72.   DIODETOALPHA PROCESS IS HUNG OR NOT RUNNING.

5-73.   To determine if DiodeToAlpha process is hung or not running, proceed as follows:

a.   From Data Acquisition Launch window, **Monitor** DiodeToAlpha and Diode Receive processes.

b.   Compare time stamps on last message from each program.

c.   If last message from DiodeToAlpha process is two minutes or more older than last message from the Diode Receive process, the DiodeToAlpha process is hung. **Stop** and re-**Start** the DiodeToAlpha process. If repeated attempts to restart the process are unsuccessful, contact software maintenance.

d.   If time stamps are less than two minutes apart, the DiodeToAlpha process is running. Continue troubleshooting IAW table 5-2.

5-74.   DIODE RECEIVE PROCESS IS HUNG OR NOT RUNNING.

5-75.   To determine if Diode Receive process is hung or not running, proceed as follows:

a.   From Data Acquisition Launch window, **Monitor** Diode Receive and RT Reader processes.

b.   Compare time stamps on last message from each program.

c.   If last message from Diode Receive process is more than one minute older than last message from RT Reader, the Diode Receive process is hung. **Stop** and re-**Start** Diode Receive process. If repeated attempts to restart the process are unsuccessful, contact software maintenance.

d.   If time stamps are less than one minute apart, the Diode Receive process is running. Continue troubleshooting IAW table 5-2.

5-76.   RT READER PROCESS IS NOT RUNNING OR IS LISTENING TO THE WRONG SIDE.

5-77.   To determine if RT Reader process is not running or is listening to the wrong side, proceed as follows:

a.   In Data Acquisition Launch window, **login** to Waveform Server (wfsa).

b.   Search for RT Reader process by typing:

```
/usr/ucb/ps -auxww | grep rt_reader | grep -v grep↵
```

c.   If there is no output, the RT Reader process is not running.

(1)   **Stop** Diode Receive process.

(2)   **Start** RT Reader process.

(3)   **Start** Diode Receive process.

(4)   Repeat step b.

(5)   If there is still no output, contact software maintenance.

d.   If the `side=` and `uside=` values are NOT equal, RT Reader process is listening to the wrong side.

(1)   **Stop** Diode Receive process.

(2)   **Stop** RT Reader process.

(3)   **Start** RT Reader process.

(4)   **Start** Diode Receive process.

(5)   Repeat step b.

(6)   If there is still no output, contact software maintenance.

e.   If the `side=` and `uside=` values are equal, RT Reader process is functioning correctly. Continue troubleshooting IAW with table 5-2.

5-78.   DIODE SEND PROCESS IS HUNG OR NOT RUNNING.

5-79.   To determine if Diode_send is hung or not running, proceed as follows:

      a.   In Unclassified Data Acquisition Launch window, **Monitor** Diode Send process.

      b.   If time stamp on last message is more than one minute old, the Diode Send process is hung. **Stop** and then re-**Start** the Diode Send process. If repeated attempts to restart the process are unsuccessful, contact software maintenance.

      c.   If time stamp on last message is less than one minute old, the Diode Send process is running. Continue troubleshooting IAW table 5-2.

5-80.   SECURE DIODE LINK DOWN.

      a.   Remote login to Waveform Server (wfsa) by typing:

`rlogin wfsa`↵

      b.   Run snoop by typing:

`su`↵
`Password:` **`XXXXXXXX`**↵ (Where XXXXXXXX = root password)

`snoop -d hme2`↵

      c.   Remote login to Unclassified Diskloop Server (dlsa) by typing:

`rlogin dlsa`↵

      d.   Ping Waveform Server (wfsa) by typing:

`ping -s wfsa-diode`↵

      e.   Stop snoop by pressing **<Control> c**.

      f.   If there is any output from snoop running on classified side, diode is operating properly. Report problem to software maintenance.

      g.   If there is no output from snoop command, exit superuser by typing:

`exit`↵

      h.   Check fiber cables for sharp bends or breaks and make sure connectors are properly seated.

i.   Verify power adapters are connected to ac power centers and universal mini-media converters for both Unclassified and Classified Systems.

j.   Verify power light emitting diode's (LEDs) on universal mini-media converters are ON for both Unclassified and Classified Systems.

k.   Verify Up-Link switch on universal mini-media converters is in UP (toward power cord) position for both Unclassified and Classified Systems.

l.   Verify power LEDs on optical ethernet transceivers are ON for both Unclassified and Classified Systems.

m.   Perform removal and replacement procedures for each suspected component IAW table 5-3 until procedure in paragraph 5-80 succeeds.

5-81.   REMOVAL AND REPLACEMENT PROCEDURES.

- - NOTE - -

When a procedure specifies to shut down/power OFF the equipment, the technician should first verify if a failed item is hot-replaceable by referring to the associated COTS manual and/or system administration.

5-82.   POWER CORD.

CAUTION

Notify system administration before removing power from US NDC operating equipment.

a.   Power OFF equipment switch connected to faulty power cord.

b.   Disconnect power cord from power center.

c.   Disconnect power cord from equipment.

d.   Connect new power cord to equipment, then to power center.

e.   Turn ON equipment power switch and return to normal operation IAW chapter 2.

5-83.   POWER CENTER.

a.   Power OFF equipment connected to power center IAW chapter 3.

b.   Disconnect power center from technical power.

c.   Disconnect all ac power cords from power center.

d.   Remove power center.

e.   Install new power center.

f.   Connect ac power cords to power center.

g.   Connect power center to technical power and turn power center ON.

h.   Return any equipment powered OFF to normal operation IAW chapter 2.

5-84.   SECURE DIODE FIBER CABLE.

```
┌──────────────┐
│   CAUTION    │
└──────────────┘
```

Removing the Secure Diode fiber cable will completely interrupt all flow of data to the Classified Data Acquisition Subsystem.

a.   In the unclassified Data Acquisition Launch window, **Stop** the Diode Send process.

b.   Remove and replace cable as necessary.

c.   Verify proper operation by running the snoop command IAW paragraph 5-80.

d.   In the unclassified Data Acquisition Launch window, **Start** the Diode Send process.

5-85.   ⚡ ETHERNET TRANSCEIVER AND MEDIA CONVERTER.

```
┌──────────────┐
│   CAUTION    │
└──────────────┘
```

Disabling Secure Diode will completely interrupt all flow of data to Classified Data Acquisition System.

a.   In unclassified Data Acquisition Launch window, **Stop** Diode Send process.

b.   Disconnect ac power from associated universal mini-media converter.

c. Remove and replace failed component.

d. Reconnect ac power to universal mini-media converter.

e. Verify proper operation by running snoop command IAW paragraph 5-80.

f. In unclassified Data Acquisition Launch window, **Start** the Diode Send process.

5-86. ⚡ PIPELINE PROCESSORS (ULTRA 1 AND ULTRA ENTERPRISE 450).

> **CAUTION**
>
> *Disabling a Pipeline Processor will result in disrupted pipeline processing.*

a. Reconfigure Pipeline processing IAW TI 2-NDC-1 Pipeline Processor Failure procedures.

b. Shut down/Power Off faulty Pipeline Processor IAW the Partial Shutdown/ Power Off Procedures in chapter 3.

c. Remove and replace failed component(s) of the Ultra 1 Creator Workstation IAW ITI 2WS-ULTRA1-2 or the Ultra Enterprise 450 IAW ITI 2WS-ULTRA/E450-1.

d. Reactivate Pipeline Processor IAW procedure in chapter 3.

e. Reconfigure Pipeline processing back to original configuration IAW TI 2-NDC-1 Pipeline Processor Failure procedures.

f. Start all Pipeline processing IAW procedure in TI 2-NDC-1.

5-87. ⚡ ULTRA 1 WORKSTATION.

a. Shut down/power OFF Ultra 1 workstation IAW Partial Shutdown/Power Off Procedures provided in chapter 3.

b. Remove and replace faulty component(s) IAW ITI 2WS-ULTRA1-2.

c. Reactivate Ultra 1 workstation IAW chapter 3.

5-88. ⚡ULTRA 5 WORKSTATION AND 8MM TAPE DRIVE.

a.   Shut down/power OFF Ultra 5 workstation IAW Partial Shutdown/Power Off Procedures in chapter 3.

b.   Remove and replace faulty component(s) IAW ITI 2WS-ULTRA5/10-2 for Ultra 5 workstation and ITI 2WS-8MMTD/DSM-1 for 8mm tape drive.

c.   Reactivate Ultra 5 workstation IAW chapter 3.

5-89. ⚡ULTRA 10 WORKSTATION.

a.   Shut down/power OFF Ultra 10 workstation IAW Partial Shutdown/Power Off Procedures in chapter 3.

b.   Remove and replace faulty component(s) IAW ITI 2WS-ULTRA5/10-2.

c.   Reactivate Ultra 10 workstation IAW chapter 3.

5-90. ⚡SPARCSTATION 10 AND MULTIPACKS.

CAUTION

If one of the mirrored filesystems on a MultiPack is rebuilt, such that all data on the filesystem is lost, it will be necessary to rebuild the US NDC software directories.

a.   Shut down/power down DNS/Mail Server IAW Partial Shutdown/Power Off Procedures in chapter 3.

b.   Remove and replace faulty component(s) IAW ITI 2WS-SPARC10-1 for SPARC10 or ITI 2WS-SPARC/MP-1 and ITI 2WS-SPARC/MP-7 for MultiPacks.

c.   Reactivate DNS/Mail Server IAW procedures provided in chapter 3.

5-91. ⚡ULTRA ENTERPRISE 450 SERVER (DISKLOOP SERVER).

```
┌─────────────────┐
│    CAUTION      │
└─────────────────┘
```

Disabling Diskloop Server will completely interrupt all unclassified data flow.

a.   Shut down/power OFF Diskloop Server IAW Partial Shutdown/Power Off Procedures in chapter 3.

b.   Remove and replace faulty component(s) IAW ITI 2WS-ULTRA/E450-1 or refer to table 5-3 for applicable peripheral equipment ITI.

c.   Reactivate Diskloop Server IAW chapter 3.

5-92. ⚡ULTRA ENTERPRISE 450 SERVER AND L3500 TAPE LIBRARY (UNCLASSIFIED ARCHIVE/DATABASE SERVER).

```
┌─────────────────┐
│    CAUTION      │
└─────────────────┘
```

Disabling Unclassified Archive/Database Server will interrupt all unclassified data archiving operations.

a.   Shut down/power OFF Unclassified Archive/Database Server and peripheral(s) IAW applicable Partial Shutdown/Power Off Procedures in chapter 3.

b.   Remove and replace faulty component(s) of Ultra Enterprise 450 IAW ITI 2WS-ULTRA/E450-1 or refer to table 5-3 for applicable peripheral equipment ITI.

c.   Reactivate server and peripheral(s) IAW chapter 3.

5-93. ⚡ ULTRA ENTERPRISE 450 SERVER, L280 TAPE LIBRARY AND EXTERNAL TAPE DRIVE (CLASSIFIED ARCHIVE/DATABASE SERVER).

```
┌─────────────┐
│  CAUTION    │
└─────────────┘
```

Disabling Classified Archive/Database Server will interrupt all classified data archiving operations.

a.   Shut down/power OFF Classified Archive/Database Server and peripheral(s) IAW applicable Partial Shutdown/Power Off Procedures in chapter 3.

b.   Remove and replace faulty component(s) of Ultra Enterprise 450 IAW ITI 2WS-ULTRA/E450-1 or refer to table 5-3 for applicable peripheral equipment ITI.

c.   Reactivate server and peripheral(s) IAW chapter 3.

5-94. ⚡ ULTRA ENTERPRISE 4000 AND A3500 (WAVEFORM SERVER).

```
┌─────────────┐
│  CAUTION    │
└─────────────┘
```

Disabling Waveform Server will halt all data acquisition and pipeline processing on Classified System.

a.   Shut down/power OFF server and peripherals IAW Partial Shutdown/Power Off Procedures in chapter 3.

b.   Remove and replace faulty component(s) of Ultra Enterprise 4000 IAW ITI 2WS-ULTRA/E4000-1 or refer to table 5-3 for applicable peripheral equipment ITI.

c.   Reactivate server and peripherals IAW chapter 3.

5-95. ⚡ ULTRA ENTERPRISE 4000 (PIPELINE DB SERVER).

<div style="text-align:center">

CAUTION

</div>

Disabling Pipeline DB Server will result in disrupted pipeline processing.

d. Shut down/power OFF Pipeline DB Server and peripherals IAW Partial Shutdown/Power Off Procedures in chapter 3.

e. Remove and replace faulty component(s) of Ultra Enterprise 4000 IAW ITI 2WS-ULTRA/E4000-1 or refer to refer to table 5-3 for applicable peripheral equipment ITI.

f. Reactivate server and peripherals IAW chapter 3.

g. Start all pipeline processing IAW applicable procedure in chapter 3 of TI 2-NDC-1.

5-96. ⚡ CONSOLE SWITCH.

a. Power OFF Console Switch and associated monitor.

b. Disconnect Console Switch ac power cord from power center.

c. Verify all connections to faulty Console Switch are properly tagged, then disconnect connectors and reconnect them to new Console Switch IAW 2SE-SWITCH/KV5200-1.

d. Connect ac power cord to Console Switch and power center.

e. Reactivate Console Switch and associated monitor IAW 2SE-SWITCH/KV5200-1.

5-97. PRINTER.

a. If necessary, power OFF the printer.

b. Remove and replace faulty components IAW ITI 2WS-PRNTR/OPTRAS-1 and/or ITI 2WS-PRNTR/NA-7.

c. Notify system administration if maintenance activity requires setup procedures.

d. Power ON the printer and verify proper operation by running **PRINT MENUS** from the front panel **TESTS MENU** list.

SECTION II

PREVENTIVE MAINTENANCE

5-98. PREVENTIVE MAINTENANCE INSTRUCTIONS.

5-99. GENERAL.

5-100. This section provides a list of Preventive Maintenance Instructions/Preventive Maintenance Routines (PMI/PMRs) for the US NDC.

5-101. PREVENTIVE MAINTENANCE INSTRUCTIONS AND PREVENTIVE MAINTENANCE ROUTINES.

5-102. PMI/PMRs required for the US NDC are located in TI 2-1-6. The US NDC PMI/ PMRs are:

   a. Cleaning and inspecting the Ultra 1 units.

   b. Cleaning and inspecting the E4000 Server Base units.

   c. Cleaning and inspecting the SPARC 10 Workstations.

   d. Cleaning and inspecting the Ultra 10 units.

   e. Cleaning and inspecting the SPARCstorage MultiPack disk units.

   f. Cleaning and inspecting the SPARCstorage Multi-Disk Pack units.

   g. Cleaning and inspecting the Ultra 5 Creator units.

   h. Cleaning and inspecting the A3500 Disk Array.

   i. Replacing the battery unit in the A3500 Disk Array.

   j. Checking for faults in the A3500 Disk Array.

   k. Checking the battery replacement date for the A3500 Disk Array.

   l. Cleaning and Inspecting the SPARCstorage MultiPack disk drives.

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SYSTEM ADMINISTRATION PROCEDURES

5-103. INTRODUCTION.

5-104. This section provides information to be used only by a System Administrator.

5-105. CHANGING STATION LIST ON C2 GUARD.

      a.   Login to XTS-300 as ssa by typing:

\<SAK\> (Where \<SAK\> = \<Alt\>\<Print Scrn\> on the XTS-300 console or \<Control\>\<Break\> on a Wyse terminal)

```
AFTAC : Patrick Air Force Base

Enter user name

? ssa↵

Enter password
```

? **xxxxxxxx**↵ (Where xxxxxxxx = user password)

      b.   Set security level to high c2g and integrity level to il0 by typing:

\<SAK\>
```
Enter command

? sl↵

Enter new session security level and categories

high c2g↵

Enter new session integrity level and categories

il0↵

Is the level correct

? yes↵

Level changed.
```

c.   Enter CASS shell mode (untrusted environment) by typing:

<SAK>

Enter command

? **run⏎**

ssa>

d.   Make a copy of `startl.txt` file by typing:

cp startl.txt startl.orig⏎

e.   Edit `startl.txt` file under directory `/c2g/q1/context_tables/` `seismic` by typing:

ssa> **vi /c2g/q1/context_tables/seismic/startl.txt⏎**

- - NOTE - -

In next step, ensure station name is a total of five spaces; pad name with spaces to the right, if necessary.

f.   Add desired stations, left-justified, one per line.

g.   Close and save the file `startl.txt`.

h.   Exit untrusted environment by typing:

ssa> **exit⏎**

i.   Log out of ssa by typing:

<SAK>

Enter command

? **logout**

Logout complete

5-106. ACCOUNT GENERATION.

5-107. OPS ACCOUNTS (som, analyst, eval).

a.   Create a standard ops account on wfsa.

b.   Switch to user account created in step a. by typing:

`su - <account name>`↵ (Where <account name> = name of new account)

c.   Run the script initUserEnv by typing:

`/usndc/ops/bin/ndc_env SYS_HOME=/usndc/ops \`

`/usndc/ops/config/environment/home/initUserEnv \`

`type=xxxxxxx home_dir=/home/<account name> sys_home=/usndc/ops`↵
(Where xxxxxxx = SOM, analyst, or eval, and <account name> = account name
created in step a.)

d.   The computer will show the following response:

`This will remove the following files in /home/<account name>:`

`.cshrc .dt .dtprofile .login .printers .rhosts .netscape .ARSinit`
`.DFXinit .DMinit`

`Remove these files and setup the standard <account type> environment`
`(yes/no)?`

e.   Remove existing files by typing:

`yes`↵

f.   Modify `/etc/group` file on wfsa to include the user in the following groups:

(1)   For SOM accounts, include the user in the ops group, data group and
ndcgrp.

(2)   For analyst and eval accounts, include the user in the analyst group.

g.   For SOM accounts, add the user to the `/export/home/ops/.forward` file
on wfsa.

5-108.   SYSADMIN ACCOUNTS.

a.   Create a standard user account on wfsa and ndcadmin.

b.   Modify `/etc/group` file on wfsa and ndcadmin to include the sys-admin user
in the sysadm, ndcgrp, ops, and data groups.

5-109.   DBA ACCOUNTS.

   a.   Create a standard user account on wfsa and ndcadmin.

   b.   Modify `/etc/group` file on wfsa and ndcadmin to include the dba user in the dba group and the ndcgrp group.

5-110.   CM ACCOUNTS.

   a.   Create a standard user account on wfsa and ndcadmin.

   b.   Modify `/etc/group` file on wfsa and ndcadmin to include the cm user in the cm group and ndcgrp group.

5-111.   SAM-FS PROCEDURES.

5-112.   SAM-FS is used to implement a hierarchical storage management (HSM) architecture for both the classified and unclassified archives of the US NDC. SAM-FS maintains its own Unix-like filesystem as a catalog for all information archived to its storage media. A block of disk storage is used as a disk cache for the archive.

5-113.   As data files are written to the disk cache, the files are copied to tape archives as specified in the SAM-FS archiver command file. As the disk cache fills up, the oldest data gets pushed out once it has been archived to tape, but remains cataloged in the filesystem until explicitly deleted. When a user attempts to access older data, SAM-FS determines whether the data is still in disk cache. This is known as staging and can either be automatic or require user intervention.

5-114.   The unclassified archive uses a 100-slot digital linear tape (DLT) robot as its archival mechanism. The robot has 96 fixed slots in its internal storage array and 4 slots in a load port door which can be opened to facilitate loading/unloading tapes and cleaning cartridges. Tapes and cleaning cartridges are identified by special barcode labels loaded into the label slot on the cartridge. Cleaning cartridges can remain loaded until their useful life of 20 cleaning cycles has been spent. If a cleaning cartridge is loaded with its proper Climaxed type barcode label, SAM-FS will automatically recognize it and count cleaning cycles used as long as the cartridge remains loaded. The most recent 180 days of data is kept in the robot-accessible tapes and is cataloged in the SAM-FS file structure. After 180 days, the data is deleted from the SAM-FS file structure and the tapes are automatically recycled. All archived data is available in robotically-accessible media; therefore, operator intervention is unnecessary for data access. For normal operation, the unclassified archive requires no operator intervention except for occasionally changing the cleaning cartridges.

5-115.   The classified archive uses an 8-slot DLT autochanger as its archival mechanism. A continuous archive of all data from the beginning of US NDC operations through the present is kept in the archive file structure. Individual data (one day of data) is assigned to specific archive tapes in sequence in the classified archive. Full tapes are removed from the

autochanger and set aside until a request is received to access older data. Operator intervention is necessary to load tapes into the archive, add additional data days to archive tapes, and load existing tapes in response to user requests for staging old data. The first three of the following procedures describe how to perform these routine operator interventions.

5-116.   Paragraph 5-124. provides the procedure for identifying the buildup of lost files, which should be performed on a regular basis.

5-117.   Also provided are a variety of troubleshooting procedures for SAM-FS. The System Administrator should be familiar with ITI 2WS-SAM-FS-8 and the SAM-FS man pages prior to using these procedures.

5-118.   LOADING TAPES INTO THE SAM-FS CLASSIFIED ARCHIVE.

5-119.   Loading tapes into the SAM-FS classified archive is used for loading both existing SAM-FS tapes and blank tapes to be incorporated into the SAM-FS classified archive.

      a.   Log onto carch as root.

      b.   Change to c-shell.

      c.   Run samu.

      d.   Shut OFF tape drive in the DLT autochanger by typing:

```
<Shift>:
Command: off 21↵
```

      e.   Launch Robottool in background by typing:

```
setenv DISPLAY yourhost:0.0↵
robottool &↵
```

      f.   Select DLT autochanger from Robot Manager Tool display by clicking on **ml** in Robots window located in upper left corner of display. The **Full Audit**, **Change State**, and **Unload** buttons on upper right corner of display should be highlighted, and the list of eight volume serial numbers (VSNs) currently loaded in DLT autochanger tape tray should appear in VSN Catalog window.

      g.   To permit DLT autochanger tape tray to be removed, click **Unload** button in upper right corner. The **eb** device should change to OFF state and VSN Catalog window should be grayed out.

h.   Remove the autochanger tape tray and insert or replace tapes as described in Section 2.1 of ITI 2WS-DLT/L280-1.

i.   To turn DLT autochanger tape drive ON, type the following in samu display:

`<Shift>:`

Command: **on 21**↵

j.   Turn DLT autochanger mechanism ON by right-clicking **Change State** button.

k.   Select **ON** from pull-down menu. The VSN Catalog window should show all seven slots unlabeled.

- - NOTE - -

The following procedure takes approximately 30 minutes to perform.

l.   Click **Full Audit** button to identify labels of each tape.

m.   A dialog box will appear warning this action will take a long time. Click **Continue** to proceed with a full audit of the tape drive.

n.   Once audit is complete, any tapes in tray previously labeled by SAM-FS should have a VSN in the form of DLnnnn (where nnnn = a four-digit number assigned to the archived tape) in the VSN catalog. New tapes should show a VSN of No Label.

o.   To label an unlabeled tape, select appropriate line of VSN Catalog display. The **Label** button should be highlighted.

p.   Click **Label** button.

q.   A dialog box will appear. Enter label name in new label line of dialog box and click **Write Label** button.

r.   If any new tapes were loaded, update `archiver.cmd` file to reflect VSNs of new tapes IAW paragraph 5-120.

5-120.   ADDING DATA DAYS TO THE SAM-FS CLASSIFIED ARCHIVE.

5-121.   This procedure is used to add data days to both existing SAM-FS tapes and blank tapes to be incorporated into the SAM-FS classified archive.

- - NOTE - -

The archiver is configured to archive only the `samfs1` *filesystem mounted as* `/export/sam1`*. The* `archive` *directory, which is shared out to the NDC community as* `/data/archive`*, is located under* `/export/sam1`*. The archives of waveform data are organized in subdirectories of* `/export/sam1/archive` *in the form of* `/YYYY/DOY/HHMMSS`*. Each subdirectory holds two-hour files of raw data for each station recorded.*

     a.   Log onto carch as root.

     b.   Change to c-shell.

     c.   Determine if sufficient space is available on current loaded tape by typing:

archiver -v↵

     d.   The computer will provide a long list showing status of VSNs associated with each archive set. The following is an example of the end of a list.

```
NDC_DATA_2000_0117.1

 media:  lt

   ** No VSNs available. **


NDC_DATA_2000_0118.1

 media:  lt

 VSNs:

   DL0118

 Total space available:    1.5G


NDC_DATA_2000_0119.1

 media:  lt

 VSNs:

   DL0119

 Total space available:    1.5G
```

```
NDC_DATA_2000_0120.1

 media:  lt

 VSNs:

   DL0120

 Total space available:    3.8G
```

e.   The last archive set listed has the most recent data days added to the archive. From the above example, the NDC_DATA_2000_0120 archive set has the most recent data days and has 3.8 GB of free space available.

(1)   If next day of data to be archived contains less data than total space available on most recent tape, add new data to that tape.

(2)   If next day of data contains more data than total space available, declare tape full and use a new tape.

f.   Locate next data day to be added to taped archive by typing:

more /etc/fs/samfs/archiver.cmd↵

g.   The computer will provide a long list of data days archived and those which are not. The next data day to be archived is indicated by the term no archive preceding the data day. An example of such a printout is as follows:

```
NDC_DATA_1999_0120 archive/2000/028

 1 1h

NDC_DATA_1999_0120 archive/2000/029

 1 1h

NDC_DATA_1999_0120 archive/2000/030

 1 1h

NDC_DATA_1999_0120 archive/2000/031

 1 1h

no archive archive/2000/032

#NDC_DATA_2000_0120 archive/2000/032

# 1 1h

no archive archive/2000/033
```

```
#NDC_DATA_2000_0120 archive/2000/033

#  1 1h

no archive archive/2000/034

#NDC_DATA_2000_0120 archive/2000/034

#  1 1h
```

- - NOTE - -

The following steps will use data days from the example above. Substitute proper data day when typing commands in this procedure.

h.   Determine space needed to archive the next data day and the following day by typing:

du -sk /data/archive/2000/03[23]↵

```
2272724 /data/archive/2000/032

2236276 /data/archive/2000/033
```

i.   Since the `/data/archive/2000/032` file is 2272724 KB (or 2.27 GB), day 032 can be added to most recent tape (labeled DL0120 in example above). Day 033 must be added to a new tape.

j.   Edit the file `/etc/fs/samfs/archiver.cmd.tmp` by removing `no archive` line from archive set entry for day 2000/032.

k.   Uncomment two lines following `no archive` line.

l.   Remove `no archive` line from archive set entry for day 2000/033.

m.   Uncomment two lines following `no archive` line.

n.   Modify next line to associate day 2000/033 with tape 0121. The new line will read `NDC_DATA_2000_0121 archive/2000/033`.

o.   Move to VSN section of archiver command file.

p.   Uncomment the entry associating archive set NDC_DATA_2000_0121 with a VSN. The new archive VSN lines should read as follows:

```
NDC_DATA_2000_0117.1 lt DL0117

NDC_DATA_2000_0118.1 lt DL0118

NDC_DATA_2000_0119.1 lt DL0119

NDC_DATA_2000_0120.1 lt DL0120

NDC_DATA_2000_0121.1 lt DL0121

#NDC_DATA_2000_0122.1 lt DL0122

#NDC_DATA_2000_0123.1 lt DL0123

#NDC_DATA_2000_0124.1 lt DL0124
```

q.   Close the editor saving the `/etc/fs/samfs/archiver.cmd.tmp` file.

r.   Verify changes by typing:

archiver -A /etc/fs/samfs/archiver.cmd.tmp↵

s.   If newly edited archiver command file is not valid, archiver verification check will return a lengthy message, the last line of which will read:

```
Errors in archiver command file
```

t.   The most common error, other than typographical errors, is assigning a data day to a new archive set without also assigning the archive set to a VSN. Correct the error by assigning the archive set to a VSN as described in steps 5-120. o. through 5-120. q.

u.   Repeat verification process in steps 5-120. r. through 5-120. t.

v.   Once the temporary archiver command file is verified, copy it to the operational archiver command file by typing:

cp /etc/fs/samfs/archiver.cmd.tmp /etc/fs/samfs/archiver.cmd↵

w.   If any new VSNs were identified, load the corresponding new tapes IAW paragraph 5-118.

5-122.   STAGING OLD DATA FROM THE SAM-FS ARCHIVE.

5-123.   Staging data refers to retrieving old data from SAM-FS archive tapes and making data available in `/data/archive` filesystem on carch. This procedure should be used in conjunction with procedure for loading tapes into SAM-FS in paragraph 5-118.

a.	Determine which subdirectories in `/data/archive` are to be staged by translating the date requested into YYYY/DOY/HHMMSS format (where YYYY/DOY/ HHMMSS = year, day of year, hour, minute and second of date for subdirectory to be staged).

b.	Determine which set of even-numbered two-hour blocks cover the time range requested.

c.	Log onto carch as root.

d.	Change to c-shell.

e.	Type the following for each subdirectory requested:

`sls -D /data/archive/YYYY/DOY/HHMMSS`↵ (Where YYYY/DOY/HHMMSS = year, day of year, hour, minute and second of date for subdirectory to be staged)

f.	Determine which tapes contain subdirectories to be staged by examining computer response. The following is an example of the information provided by the computer for each file in the directory.

```
/data/archive/YYYY/DOY/HHMMSS/SEGMENT_BBLP.000000.w:
 mode:-rw-rw-r--    links: 1  owner: johnx      group: data
 length:     778464  inode: 901580
 offline;  archdone;
 copy 1: ---- Sep  3 00:45       becd.91767 lt DLnnnn
 access:      Aug 30  1999  modification: Aug 30   1999
 changed:     Aug 30  1999  attributes:   none
 creation:    Aug 30  1999  residence:    Oct 16 14:12
```

g.	In the example, SEGMENT_BBLP.000000.w file has been archived and removed from disk, as indicated by the line reading `offline;  archdone;`. The entry `DLnnnn` indicates the VSN of the tape on which the file is archived (where nnnn = a four-digit number assigned to the tape).

h.	Load each tape, up to a maximum of seven, identified in the computer response from previous step IAW the tape loading procedure in paragraph 5-118. For more than seven tapes, repeat this procedure.

         i.   For each directory on each tape, type the following:

stage -Vr /export/sam1/archive/YYYY/DOY/HHMMSS↵ (Where YYYY/DOY/
HHMMSS = year, day of year, hour, minute and second of date for subdirectory to be
staged)

         j.   The computer will respond with a list of all files to be staged. Staging will occur
in background and progress can be monitored by running samu and selecting the **u**
command.

5-124.   IDENTIFYING BUILDUP OF LOST FILES.

<div align="center">

- - NOTE - -

The following procedure should be performed on a weekly basis.

</div>

         a.   To identify buildup of any lost files in samfs filesystem, type:

samfsck -V <sam-fs filesystem> > <unix_filesystem>/samfsck.log&↵
(Where <sam-fs filesystem> = name of sam-fs filesystem in question and
<unix_filesystem> = name of unix filesystem that the sam-fs filesystem is mounted on)

         b.   If lost files exist, go to lost+found directory in the unix filesystem in question.

         c.   If a lost+found directory does not exist, create one with enough directory
entries to accommodate the number of files expected to be recovered. To do this, type:

ksh↵

/bin/mkdir <unix_filesystem>/lost+found↵ (Where <unix_filesystem> =
name of the unix filesystem in question)

N=0↵

while [$N -lt 4000]; do↵

touch TMPFILE$N↵

N=`expr $N + 1`↵

done↵

rm TMPFILE*↵

exit↵

d.	To unmount samfs filesystems, reboot SAM-FS server with samfs-type filesystems set not to mount at boot time. This is done as follows:

(1)	Edit `/etc/vfstab` file and change the `mount at boot` parameter from `yes` to `no`.

(2)	Request Maintenance Control personnel disable the archive processes.

(3)	Reboot carch.

e.	To recover lost files, type:

`samfsck -F <sam-fs_filesystem> > samfsck.log&`↵ (Where `<sam-fs_filesystem>` = name of sam-fs filesystem in question)

f.	Edit `/etc/vfstab` file by changing the `mount to boot` parameter from `no` to `yes`.

g.	Reboot carch.

h.	Delete contents of lost+found directory.

i.	Request Maintenance Control personnel enable the archive processes.

5-125.	LOADING TAPES OR CLEANING CARTRIDGE INTO SAM-FS UNCLASSIFIED ARCHIVE.

5-126.	Loading tapes or cleaning cartridges into SAM-FS Unclassified Archive explains how to introduce tapes or cleaning cartridges into the L3500 robot library used by the Unclassified Archive. Loading tapes or cleaning cartridges into SAM-FS Unclassified Archive explains how to introduce tapes or cleaning cartridges into the L3500 robot library used by the Unclassified Archive. The L3500 has 96 fixed slots which show up as slots 0-95 on the samu VSN display. The remaining four slots are in the load port door and are numbered 96-99 on the VSN display. When loading tapes it is advisable to use samu

commands to move the tape to a fixed slot after closing the door to allow the load slot ports to be open for loading/inserting a tape or cleaning cartridge into the library.

     a.   To load a tape or cleaning cartridge into the robot, log onto uarch as root.

     b.   Change to c-shell.

     c.   Run samu.

     d.   To allow the L3500 load port to be opened, type:

`:export 20 0`↵

     e.   Load the tape or cleaning cartridge into the open load port as described in applicable procedure in chapter 3 of ITI 2WS-DLT/L3500-1.

     f.   Once the load port has been closed, return to samu.

     g.   To allow SAM-FS to recognize that new tapes/cleaning cartridges have been loaded, type:

`:import 20`↵

     h.   The new tapes/cleaning cartridges should appear on the samu VSN display as entries in slots 96-99 with VSNs designated by the barcode labels. If they do not, check the barcode labels to ensure they are not defaced.

     (1)   If they are defaced, place a new barcode on the tape/cartridge and perform procedure again.

     (2)   If the barcode labels are not defaced, examine the device log to determine if a robot malfunction has occurred.

     (3)   If a malfunction has occurred, troubleshoot as described in chapter 4 of ITI 2WS-DLT/L3500-1.

     (4)   If the cause of the problem cannot be determined from the contents of the device log, there are no further local troubleshooting procedures that can be performed. Contact Software Maintenance personnel or the SAM-FS vendor support system for further advice.

     i.   If desired, move the tape or cleaning cartridge to an empty slot in the robot by typing:

`:!move <xxxx> <yyyy> 20`↵ (Where xxxx = robot slot # where tape is presently located and yyyy = empty robot slot #)

5-127. REMOVING TAPE OR CLEANING CARTRIDGE FROM SAM-FS UNCLASSIFIED ARCHIVE.

a.   Log onto uarch as root.

b.   Change to c-shell.

c.   Run samu.

d.   If the tape or cleaning cartridge is not already in a load port slot (slots 96-99 of the VSN display) move the tape or cleaning cartridge to an empty slot in the load port by typing:

`:!move <xxxx> <zzzz> 20`↵ (Where xxxx = robot slot # where tape is presently located and zzzz = empty load port slot)

e.   Wait for the VSN display to show the tape in question appears in the appropriate load port slot.

f.   To allow the L3500 load port to be opened, type:

`:export 20 0`↵

g.   Remove the tape or cleaning cartridge from the open load port as described in applicable procedure in chapter 3 of ITI 2WS-DLT/L3500-1.

h.   Once the load port has been closed, return to samu.

i.   To allow SAM-FS to recognize that new tapes/cleaning cartridges have been removed, type:

`:import 20`↵

5-128.   TROUBLESHOOTING COMMON SAM-FS PROBLEMS.

5-129.   Table 5-5 assists the System Administrator in identifying SAM-FS problems and troubleshooting solutions. The first column lists common problems or symptoms. The second column identifies possible sources of the problem or symptom. The third column provides a reference to a paragraph with steps to troubleshoot the problem.

Table 5-5. SAM-FS Troubleshooting

PROBLEM/SYMPTOM	POSSIBLE SOURCE OF PROBLEM/SYMPTOM	TROUBLESHOOTING REFERENCE
ArchivePermanent sends e-mail with SAM-FS concerns	Data days in `archiver.cmd` file are not up-to-date.	Perform paragraph 5-130.
	Intervals have not been archived to tape.	Perform paragraph 5-130.
Archiver log file shows no recent activity (Classified System)	Archiver is not working.	Perform paragraph 5-131.
Archiver log file shows no recent activity (Unclassified System)	Archiver is not working.	Perform paragraph 5-132.
Archiver status display appears to be hung	SAM-FS archiver is not working properly.	Perform paragraph 5-133.
Autochanger mechanism is marked Down	A fault has been detected in autochanger mechanism by SAM-FS.	Perform paragraph 5-134.
Autochanger tape drive unexpectedly marked OFF	Tape drive needs cleaning.	Perform paragraph 5-135.
L3500 Robot tape drive unexpectedly marked OFF	Tape drive needs cleaning.	Perform paragraph 5-136.
Robot mechanism is marked Down	A fault has been detected in robot mechanism by SAM-FS or all tape drives are off-line.	Perform paragraph 5-137.
Robot VSN catalog shows all tapes are full	Tapes are not being recycled when data more than six months old is deleted.	Perform paragraph 5-138.
Robot VSN catalog shows tapes have MEDIA ERRORs	Tapes may need replacing.	Perform paragraph 5-139.
Tape believed to contain data shows 0% use	Number needs to be reset.	Perform paragraph 5-140.
Tape drive is marked Down	A fault has been detected in the tape drive by SAM-FS.	Perform paragraph 5-141.

Table 5-5. SAM-FS Troubleshooting (Cont)

PROBLEM/SYMPTOM	POSSIBLE SOURCE OF PROBLEM/SYMPTOM	TROUBLESHOOTING REFERENCE
"Filesystem full" message entries appear in `/var/adm/messages` file when filesystem indicates only partially full	There are lost files in the filesystem.	Perform paragraph 5-142.

5-130.   ARCHIVEPERMANENT SENDS E-MAIL WITH SAM-FS CONCERNS.

a.   If the message provides a list of data days and indicates the data days need to have VSNs assigned to them, perform paragraph 5-120.

b.   If the message provides a list of intervals on the classified side and indicates the intervals should have already been archived to tape, the most likely problem is the operator has not yet added the data days to the SAM-FS archive after receiving an e-mail indicating VSN numbers need to be assigned to those data days. Perform paragraph 5-120.

c.   If the operator has already added the data days to the SAM-FS archive or if the unarchived intervals are on the unclassified side, archiving has stopped for some other reason. Return to table 5-5 or refer to chapter 5 of ITI 2WS-SAM-FS-8 for further troubleshooting procedures.

5-131.   ARCHIVER LOG FILE SHOWS NO RECENT ACTIVITY (CLASSIFIED SYSTEM).

a.   Examine archiver log file for the most recent archive activity for the filesystem in question.

b.   If there is no archiving activity in `/export/sam1`, check to see if the data days currently specified in the archiver.cmd configuration file have been fully archived by typing:

carch {root}20: **sfind /data/archive/YYYY/DOY ! -archived**↵ (Where YYYY = year and DOY = day of year for the current date)

c.   The machine will provide a list of files which remain unarchived for the date in question.

d.   If any files are listed in the output of the sfind command, refer to chapter 5 of ITI 2WS-SAM-FS-8.

5-132. ARCHIVER LOG FILE SHOWS NO RECENT ACTIVITY (UNCLASSIFIED SYSTEM).

      a.   Examine archiver log file for most recent archive activity for filesystem in question.

      b.   If there is no archiving activity in `/export/sam1`, refer to chapter 5 of ITI 2WS-SAM-FS-8.

5-133.   ARCHIVER STATUS DISPLAY APPEARS TO BE HUNG.

      a.   From samu menu, check archiver status for each filesystem by typing:

a

      b.   The archiver status display appears listing each filesystem and the status of each (e.g., `Sleeping until Wed Mar 01 21:13:11 2000` or `Scanning directory archive/1999/325`).

      c.   If the filesystem list appears without a status beneath each system, have Maintenance Control personnel disable archive processes.

      d.   Reboot the server.

      e.   Recheck archiver status.

      f.   Request Maintenance Control personnel to enable archive processes.

5-134.   AUTOCHANGER MECHANISM IS MARKED DOWN. A mechanical fault has likely occurred, causing archive to stop working on the classified side. When this occurs, perform the following procedure:

      a.   Troubleshoot the autochanger problem as directed in section 2.13 of ITI 2WS-DLT/L280-1.

      b.   Log onto carch as root.

      c.   Change to c-shell.

      d.   Run samu.

      e.   Clear the down condition by typing:

<Shift>:

Command: **on 20**↵

5-135. AUTOCHANGER TAPE DRIVE UNEXPECTEDLY MARKED OFF. If tape drive on autochanger has been marked OFF without operator intervention, perform the following procedure:

    a.   Examine device log for the cause.

    b.   If tape drive needs to be cleaned:

        (1)   Log onto carch as root.

        (2)   Change to c-shell.

        (3)   Run samu.

        (4)   Shut OFF autochanger mechanism by typing:

`<Shift>:`

`Command:` **`off 20`**↵

        (5)   Activate a cleaning cartridge as described in section 2.8 ITI 2WS-DLT/L3500-1.

        (6)   Turn ON autochanger mechanism by typing:

`<Shift>:`

`Command:` **`on 20`**↵

    c.   If the device log indicates a malfunction other than tape drive needs cleaning, troubleshoot the procedure as described in section 2.13 of ITI 2WS-DLT/L280-1.

    d.   If the cause of the OFF condition cannot be determined from the contents of the device log, attempt to turn the autochanger tape drive ON by typing:

`<Shift>:`

`Command:` **`off 21`**↵

    e.   If the problem recurs immediately, there are no further local troubleshooting procedures that can be performed. Contact Software Maintenance personnel or the SAM-FS vendor support system for further advice.

5-136. L3500 ROBOT TAPE DRIVE UNEXPECTEDLY MARKED OFF. If tape drive on robot has been marked OFF without operator intervention, perform the following procedure:

   a.   Examine device log for the cause.

   b.   If a tape drive needs to be cleaned:

      (1)   Remove spent cleaning cartridge, if necessary, as described in paragraph 5-127.

      (2)   Insert new cleaning cartridge as described in paragraph 5-125.

   c.   If the device log indicates a malfunction other than tape drive needs cleaning, troubleshoot the procedure as described in chapter 4 of ITI 2WS-DLT/L3500-1.

   d.   If the cause of the OFF condition cannot be determined from the contents of the device log, there are no further local troubleshooting procedures that can be performed. Contact Software Maintenance personnel or the SAM-FS vendor support system for further advice.

5-137. ROBOT MECHANISM IS MARKED DOWN. When a fault is detected in the robot mechanism or when all tape drives are off-line, it may cause archive to stop working on the unclassified side. When this occurs, perform the following procedure:

   a.   Clear robot fault, if necessary. Refer to ITI 2WS-DLT/L3500-1.

   b.   Log onto uarch as root.

   c.   Change to c-shell.

   d.   Run samu.

   e.   From samu menu, type:

`<Shift>:`

`Command: on 20`↵

- - NOTE - -

A full audit of the L3500 robot may take one hour or more to complete.

   f.   If tapes were stuck in drives and have to be replaced, or if VSN catalog appears incomplete (i.e., not all slots show a VSN) or is suspect in any way, a full audit of the robot VSN catalog should be performed by selecting **Full Audit** button on robottool display.

5-138.   ROBOT VSN CATALOG SHOWS ALL TAPES ARE FULL. For more detailed recycler operation and troubleshooting information, refer to chapter 6 of ITI 2WS-SAM-FS-8.

a.   Check samadmin crontab to verify the cronjob which invokes the recycler is running. This cronjob invokes the script `/home/samadmin/defrag_dlts` which invokes the recycler.

b.   If cronjob is running, check contents of recycler log file `/home/samadmin/recycler.log_old` for any error messages regarding recycler operation.

c.   Correct any problems indicated by recycler log file.

d.   Run defrag_dlts manually.

5-139.   ROBOT VSN CATALOG SHOWS TAPES HAVE MEDIA ERRORS.

a.   Make note of slot numbers and VSNs in question.

b.   Clear the media error status of the tapes. At Unix command line for each VSN identified, type:

`chmed -E lt <VSN>`↵ (Where <VSN> = VSN number of tape in question)

c.   If the media error reappears for a tape, the tape needs to be replaced. For all tapes to be replaced, type:

`chmed -E lt <VSN>`↵ (Where <VSN> = VSN number of tape in question)

`chmed +c lt <VSN>`↵ (Where <VSN> = VSN number of tape in question)

d.   Run the script `/home/samadmin/defrag_dlts` and wait for tapes to drain.

e.   When tape shows 0%, remove tape from robot.

f.   Remove barcode label and insert into slot on replacement tape.

g.   Insert replacement tape into same slot in robot.

5-140.   TAPE BELIEVED TO CONTAIN DATA SHOWS 0% USE. Reset use number from Unix command line by typing:

`auditslot -e ## <slot number>`↵ (Where ## = autochanger or robot device number, and <slot number> = slot number where tape is now loaded)

5-141.   TAPE DRIVE IS MARKED DOWN. A load fault likely exists and a tape is jammed in the autochanger causing archive to stop working on the classified side. When this occurs, perform the following procedure:

      a.   Extract jammed tape IAW section 4.3 of ITI 2WS-DLT/L280-1.

      b.   Log onto carch as root.

      c.   Change to c-shell.

      d.   Run samu.

      e.   From samu menu, clear the down condition by typing:

`<Shift>:`

`Command:` **`on 21`**↵

5-142.   "FILESYSTEM FULL" MESSAGE ENTRIES APPEAR IN `/VAR/ADM/MESSAGES` FILE WHEN FILESYSTEM INDICATES ONLY PARTIALLY FULL. Occasionally, message entries appear in the `/var/adm/messages` file which indicate the filesystem is full. The following procedure assists in verifying how full the filesystems are and how to restore any lost disk space.

- - NOTE - -

Steps 5-142. a. through 5-142. e. should be performed on a weekly basis to identify the buildup of lost files. If lost files exist, perform steps 5-124. b. through 5-124. i.

      a.   Check `/var/adm/messages` file for repeated messages similar to the following:

- - NOTE - -

In the following sample output, the unix filesystem is `/export/ sam1.`

`Jan 14 16:45:55 carch unix: NOTICE: SAM-FS: sam_wait_space: /export/ sam1: File system full - waiting`

      b.   To check if the unix filesystem is really full, type:

`df -k <unix_filesystem>`↵ (Where <unix_filesystem> = name of the unix filesystem in question)

```
Filesystem   kbytes    used     avail    capacity   mounted on
  samfs1    88385536 77891184 10449352     89%     /export/sam1
```

- - NOTE - -

The filesystems in question are managed by SAM-FS and are samfs-type rather than standard unix filesystems.

    c.   The computer response may indicate the unix filesystem is only partially full. When this occurs, the user cannot write any additional files to `<unix_filesystem>`. This indicates the disk is full; however, the unix utilities cannot see the problem because the filesystems are not standard unix filesystems.

- - NOTE - -

Be sure to monitor the results of the following step in the log file.

    d.   Verify this by checking the status of samfs-type filesystems by typing:

`samfsck -V <sam-fs_filesystem> > <unix_filesystem>/samfsck.log&↵`
(Where <sam-fs_filesystem> = name of the sam-fs filesystem in question)

    e.   If results indicate there are lost files in the filesystem in question, the files must be recovered and deleted to recover lost space on the filesystem. Perform steps 5-124. b. through 5-124. i.

5-143. BACKUP OF FILESYSTEMS.

```
┌──────────────────┐
█ CAUTION         │
│                  │
└──────────────────┘
```

CAUTION

Some tape drives are used by Oracle to perform daily backups via cronjobs on several machines. Prior to performing a backup of any file, ensure the destination tape drive is not being used by Oracle or any other program. Failure to do so could result in loss of critical data.

•Oracle backup cronjobs are done without a rewind option; therefore, if removing a tape from a disk drive to perform a file backup, ensure a new backup tape is started in the tape drive when finished. Otherwise, return the original tape to the tape drive and manually reposition the tape to the proper position for the next Oracle backup or critical data could be lost.

- - NOTE - -

The preferred tape drives for doing system backups are the 8mm tape drives installed on the usysadmin and sysadmin workstations.

•It is not recommended that a Level 0 dump be performed while a machine is booted from that volume. If a ufsdump is performed using the verify option, the dump will fail if the volume is mounted.

5-144.   Table 5-6 provides a schedule for performing backups for the NDC filesystems. The first column lists the machine name. The second column lists the filesystems or directories to be backed up. The third column provides a brief description of the procedure for the filesystems/directories listed in column two along with the tape drive to be used. The fourth column provides the interval at which each filesystem/directory should be backed up.

Table 5-6. Filesystem Backups

MACHINE NAME	FILESYSTEM/ DIRECTORY TO BE BACKED UP	TAPE DRIVE AND PROCEDURE USED	BACKUP INTERVAL
analyst1 - analyst6	None*	N/A	N/A
carch	root partition	Boot from CD-ROM drive and perform a Level 0 dump to 8mm tape drive on sysadmin.	If patches or other configuration changes are made or periodically at the discretion of the System Administrator.
	`/export/home/ samadmin`	Tar files in the directory and transfer to available tape drive.	If SAM-FS upgrades or other configuration changes are made to carch or periodically at the discretion of the System Administrator.
	`/etc/fs/samfs`	Tar files in the directory and transfer to available tape drive.	At the same time as backing up `/export/home/ samadmin`.
uarch	root partition	Boot from CD-ROM drive and perform a Level 0 dump to 8mm tape drive on usysadmin.	If patches or other configuration changes are made to uarch or periodically at the discretion of the System Administrator.
	`/export/home/ samadmin`	Tar files in the directory and transfer to available tape drive.	If SAM-FS upgrades or other configuration changes are made or periodically at the discretion of the System Administrator.

Table 5-6. Filesystem Backups (Cont)

MACHINE NAME	FILESYSTEM/ DIRECTORY TO BE BACKED UP	TAPE DRIVE AND PROCEDURE USED	BACKUP INTERVAL
uarch (cont)	`/etc/fs/samfs`	Tar files in the directory and transfer to available tape drive.	At the same time as backing up `/export/home/ samadmin`.
cdam	None*	N/A	N/A
cdbsa	root partition	Boot from CD-ROM drive and dump files to local DLT drive.	If patches or other configuration changes are made or periodically at the discretion of the System Administrator.
dbadmin	None*	N/A	N/A
eval1 - eval6	None*	N/A	N/A
dlsa	root partition	Boot from the network and perform a Level 0 dump to 8mm tape drive on usysadmin.	Periodically at the discretion of the System Administrator.
ndcadmin	root partition	Boot from the network and perform a Level 0 dump to remote tape drive on usysadmin.	When patches or configuration changes are made or periodically at the discretion of the System Administrator.
	`/opt/yp`	Tar files in the directory and transfer to available tape drive.	Periodically at the discretion of the System Administrator.
	`/var/mail`	Tar files in the directory and transfer to available tape drive.	Periodically at the discretion of the System Administrator.
	`/export/disk1/ install`	Tar files in the directory and transfer to available tape drive.	If the JumpStart configuration is changed.

Table 5-6. Filesystem Backups (Cont)

MACHINE NAME	FILESYSTEM/ DIRECTORY TO BE BACKED UP	TAPE DRIVE AND PROCEDURE USED	BACKUP INTERVAL
ndcadmin (cont)	`/export/disk2`	Tar files in the directory and transfer to available tape drive.	When patches are applied to ndcadmin and periodically at the discretion of the System Administrator.
	`/export/home`	Tar files in the directory and transfer to available tape drive.	Periodically at the discretion of the System Administrator.
pipe1a - pipe7a	None*	N/A	N/A
pipe8a	root partition	Boot from CD-ROM drive and perform a Level 0 dump to remote tape drive on sysadmin.	When patches are applied to ndcadmin and periodically at the discretion of the System Administrator.
	`/disk2/install`	Tar files in the directory and transfer to available tape drive.	If the JumpStart configuration is changed.
sysadmin	None*	N/A	N/A
udam	None*	N/A	N/A
usysadmin	None*	N/A	N/A
wfsa	root partition	Boot from CD-ROM drive and perform a Level 0 dump to remote tape drive on sysadmin.	When patches are applied to ndcadmin and periodically at the discretion of the System Administrator.
	`/opt/yp`	Tar files in the directory and transfer to available tape drive.	Periodically at the discretion of the System Administrator.

Table 5-6. Filesystem Backups (Cont)

MACHINE NAME	FILESYSTEM/ DIRECTORY TO BE BACKED UP	TAPE DRIVE AND PROCEDURE USED	BACKUP INTERVAL
wfsa (cont)	/export/home	Tar files in the directory and transfer to available tape drive.	Periodically at the discretion of the System Administrator.
	/var/mail	Tar files in the directory and transfer to available tape drive.	Periodically at the discretion of the System Administrator.

*Machines are loaded from the JumpStart server and can be reloaded that way at any time; therefore, backups are unnecessary.

CHAPTER 6

ILLUSTRATED PARTS BREAKDOWN

6-1. INTRODUCTION.

6-2.   Chapter 6 contains illustrations, listings and descriptions of the parts and assemblies which comprise the United States National Data Center (US NDC), consisting of a Classified System and an Unclassified System. The illustrations in this chapter identify the parts of the equipment which are replaceable or repairable at the organizational level. Each figure represents an assembly or end item and each of its subassemblies or components. Each assembly, subassembly, end item or component is then listed in the Group Assembly Parts List (GAPL).

6-3.   The Illustrated Parts Breakdown (IPB) has been changed to reflect a higher level presentation of the equipment items. This change was implemented as a cost-saving measure to reduce unnecessary documentation of commercial off-the-shelf (COTS) equipment. This chapter is intended to be used in conjunction with the applicable COTS manuals or identifying technical instructions (ITIs) identified in chapter 1. An exception to this is when the configuration of internal components is unique to the US NDC application, then the information will be provided in this manual. All ITIs were reviewed and deemed adequate for part numbers and locations. As any equipment item is upgraded, if the specific equipment changes are not documented in the item's ITI, it will be added to this manual.

6-4.   In the following figures and GAPLs, the most common items are shown with the minimal equipment necessary and are representative of all similar equipment. Rear views are shown to identify cable connections when it necessary to connect them precisely as shown in the drawing. Any items not specifically shown in the drawings are not shown because there is only one possible location for the item to be connected (e.g., power plug).

SECTION I

GENERAL INFORMATION

6-5. GENERAL.

6-6.   This section provides information for illustration grouping, end items, and means of locating parts.

6-7. ILLUSTRATION GROUPING.

6-8.   The illustrations for the US NDC are grouped with each item followed by illustrations of components or assemblies for that item. Each illustration is followed by a GAPL.

6-9.   END ITEMS AND ASSEMBLIES.

6-10.   Figures 6-1 through 6-26 illustrate the various items, their assemblies and components for the US NDC.   Each assembly or component is illustrated and listed immediately after the major assembly or component of which it is a part.

6-11.   LOCATING A PART.

6-12.   HOW TO USE THE GAPL WHEN THE PART NUMBER IS KNOWN.

6-13.   If the part number is known, refer to the applicable GAPL.   Scan the PART NUMBER column until the known part number is located. The FIG & INDEX NO. column will reference the part to a specific illustration (figure number) which shows the location (index number) of the part.   The MFR CODE column identifies the manufacturer of the part by a five-digit number.   The DESCRIPTION column describes the assembly and each of its parts.

6-14.   HOW TO USE THE GAPL WHEN THE PART NUMBER IS UNKNOWN.

6-15.   If the part number is unknown, see figures 6-1 through 6-26 to locate the part. Determine the figure number and index number associated with the part to be identified. Refer to the corresponding FIG & INDEX NO column in the appropriate GAPL.   The part number, manufacturer's code, nomenclature, and reference designation are provided in the GAPL adjacent to the illustrated index number references.

SECTION II

GROUP ASSEMBLY PARTS LIST

6-16.   GENERAL.

6-17.   This section describes the use of the GAPL which is located immediately after the applicable illustration.

6-18.   GROUP ASSEMBLY PARTS LIST.

6-19.   The GAPL contains four columns and includes the figure and index number, the part number, the manufacturer's code, and the item description for the subsystem, assembly or subassembly.

6-20.   FIG AND INDEX NO.

6-21.   Column one supplies the key to the illustrations. The complete identification of a part consists of the figure number followed by a dash, and the index number. The figure number appears only one within each GAPL, at the first entry. Each part is then identified in the list by the index number which corresponds to a number on the applicable illustration. The quantity of each part is indicated in parentheticals on the illustration, if more than one part is provided.

6-22.   PART NUMBER.

6-23.   Column two provides the part number for the item listed. Not all listed items have part numbers assigned. For these items, sufficient information is presented in column four to identify the part.   The part numbers are used to order replacement parts.   If a manufacturer no longer stocks a particular item, the technician should order a suitable substitution replacement item.

6-24.   MFR CODE.

6-25.   Column three contains a five-digit code identifying the manufacturer. Those items with MFR CODE 1JPW3 are manufactured at the depot.

6-26.   DESCRIPTION.

6-27.   Column four contains the name and description of each part listed. For some parts, the description may consist of the name only. For others, the description may consist of the name modifiers and details necessary to identify a part.

6-28.   REFERENCE DESIGNATIONS.

6-29.   Column five contains the REF. DES. for listed items. Section II of this chapter describes the REF. DES. used in this manual.
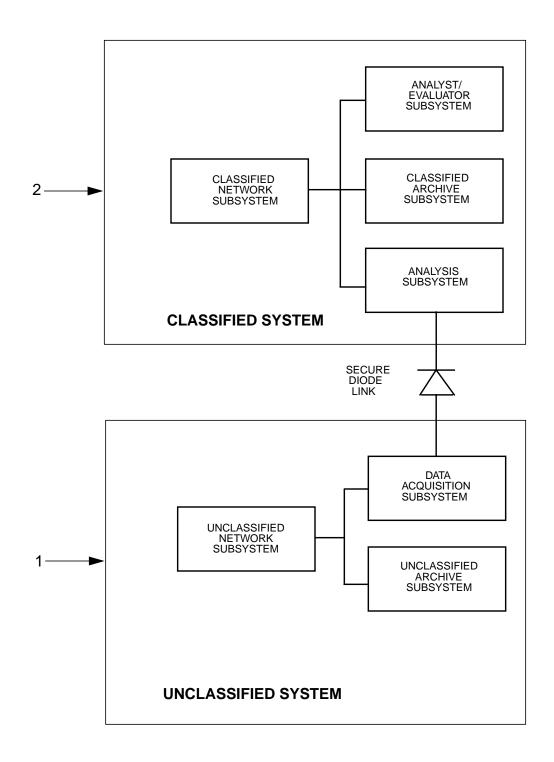
Figure 6-1. United States National Data Center

FIG. & INDEX NO.	PART NUMBER	MFR	DESCRIPTION	REF. DES.
6-1-		1JPW3	UNITED STATES NATIONAL DATA CENTER DIAGRAM	N/AQ
1		1JPW3	. US NDC UNCLASSIFIED SYSTEM (See figure 6- 2)	U
2		1JPW3	. US NDC CLASSIFIED SYSTEM (See figure 6- 9)	C
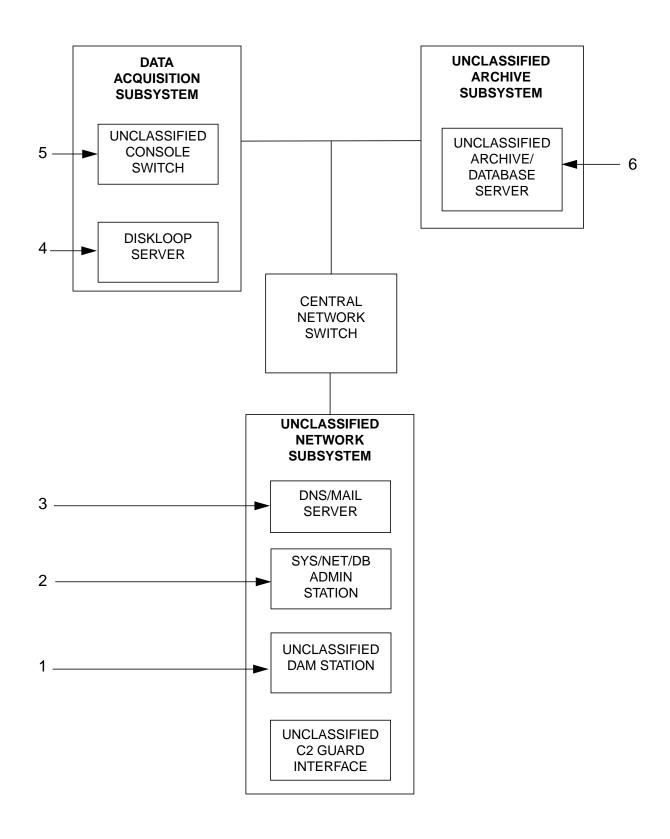
Figure 6-2. US NDC Unclassified System

FIG. & INDEX NO.	PART NUMBER	MFR	DESCRIPTION	REF. DES.
6-2-		1JPW3	. US NDC UNCLASSIFIED SYSTEM (See figure 6- 1 for NHA)	U
1		1JPW3	. . UNCLASSIFIED DAM STATION (See figure 6- 3)	U1A1
2		1JPW3	. . SYS/NET/DB ADMIN STATION (See figure 6- 4)	U1A3
3		1JPW3	. . DNS/MAIL SERVER (See figure 6- 5)	U1A2
4		1JPW3	. . DISKLOOP SERVER (See figure 6- 6)	U2A1
5		1JPW3	. . UNCLASSIFIED CONSOLE SWITCH (See figure 6- 7)	U2A2
6		1JPW3	. . UNCLASSIFIED ARCHIVE/ DATABASE SERVER (See figure 6- 8)	U3A1

RIGHT   LEFT
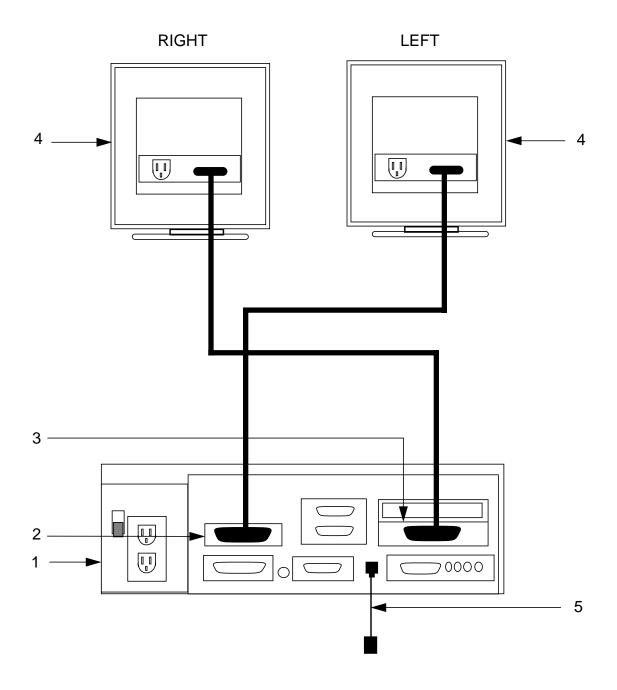
Figure 6-3. Unclassified DAM Station

FIG. & INDEX NO.	PART NUMBER	MFR	DESCRIPTION	REF. DES.
6-3-		1JPW3	. . UNCLASSIFIED DAM STATION (See figure 6-2 for NHA)	U1A1
1	A12-UBA1-1E-128AB	7X430	. . . WORKSTATION, Ultra 1 Creator	U1A1A1
2	501-4127-01	7X430	. . . . CARD, Creator Graphics Frame Buffer	
3	501-2922		. . . . CARD, Turbo GX Graphics	
4	365-1399	7X430	. . . MONITOR, 21 in Color w/ 13W3 Cable	U1A1A2 & U1A1A3
5	EVNSL71A w/2 ea FM733	1JPW3	. . . CABLE, RJ45 10/100 Base-T	W10
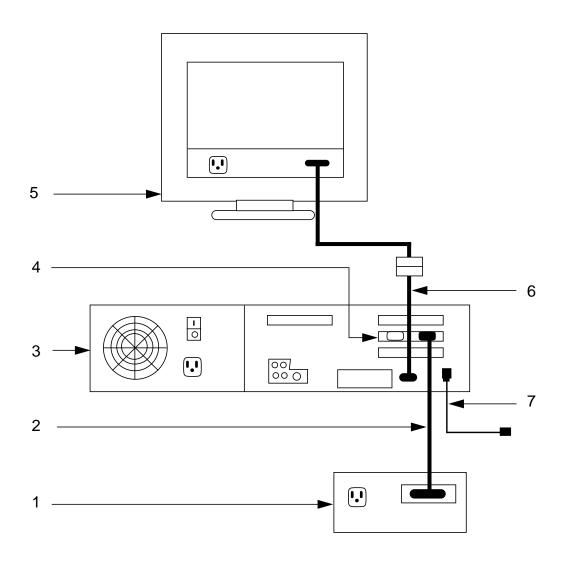
Figure 6-4. Sys/Net/DB Admin Station

FIG. & INDEX NO.	PART NUMBER	MFR	DESCRIPTION	REF. DES.
6-4-		1JPW3	. . SYS/NET/DB ADMIN STATION (See figure 6- 2 for NHA)	U1A3
1	599-2132	7X430	. . . TAPE DRIVE, 8 mm, 7-14 GB	
2	530-2453-01	7X430	. . . CABLE, SCSI, 68-pin, 2 M	W141
3	A21-UFE1A9J-128AG	7X430	. . . WORKSTATION, Ultra 5 Creator	U1A3A1
4	595-4399	7X430	. . . . CARD, SCSI Host Adapter	
5	365-1383	7X430	. . . MONITOR, 21 in Color	U1A3A2
6	530-2357	7X430	. . . ADAPTER, Monitor Cable	
7	EVNSL71A w/2 ea FM733	1JPW3	. . . CABLE, RJ45 10/100 Base-T	W11
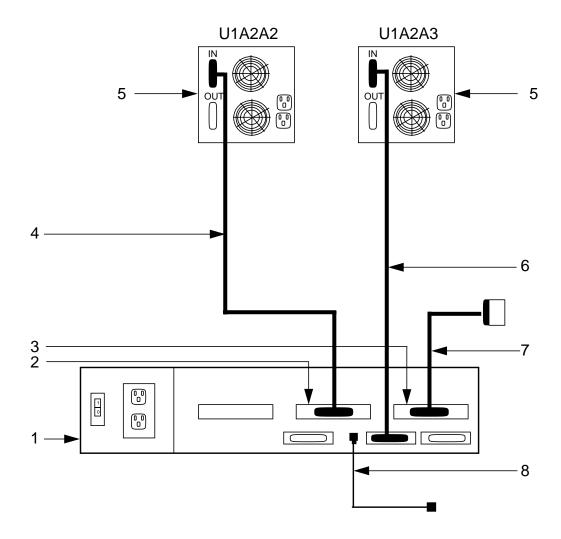
Figure 6-5. DNS/Mail Server

FIG. & INDEX NO.	PART NUMBER	MFR	DESCRIPTION	REF. DES.
6-5-		1JPW3	. . DNS/MAIL Server (See figure 6-2 for NHA)	U1A2
1	SS10	7X430	. . . SPARCSTATION 10	U1A2A1
2	370-1704	7X430	. . . . CARD, Differential, fast/wide SCSI	
3	501-1996	7X430	. . . . CARD, Graphics CG6 Color Frame Buffer	
4	530-1884-03	7X430	. . . CABLE, External SCSI	W104
5	595-4280-02	7X430	. . . SPARCSTORAGE MULTIPACK	U1A2A2 & U1A2A3
6	530-2115-02	7X430	. . . CABLE, External SCSI	W105
7	ENH205-010	59951	. . . CABLE, Computer to Console Switch, 10 ft	W6
8	EVNSL71A w/2 ea FM733	1JPW3	. . . CABLE, RJ45 10/100 Base-T	W19
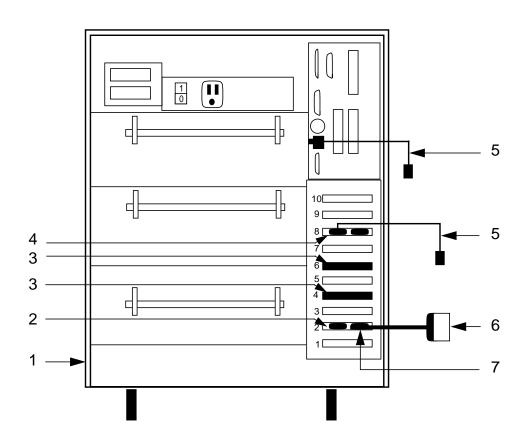
Figure 6-6. Diskloop Server

FIG. & INDEX NO.	PART NUMBER	MFR	DESCRIPTION	REF. DES.
6-6-		1JPW3	. . DISKLOOP SERVER, (See figure 6- 2 for NHA)	U2A1
1	E450	7X430	. . . SERVER, Ultra Enterprise 450	U2A1A1
2	370-3753	7X430	. . . . PCI CARD, PGX 32 Graphics Frame Buffer	
3	375-0013	7X430	. . . . PCI CARD, Dual Single-Ended Ultra SCSI Controller	
4	501-5019	7X430	. . . . CARD, PCI 10/100 Base-T Adapter	
5	EVNSL71A w/ 2ea FM733	1JPW3	. . . CABLE, RJ45 10/100 Base-T	W8 & W14
6	EHN205-005	59951	. . . CABLE, Computer to Console Switch, 5 ft	W1
7	130-4195-01	7X430	. . . ADAPTER	
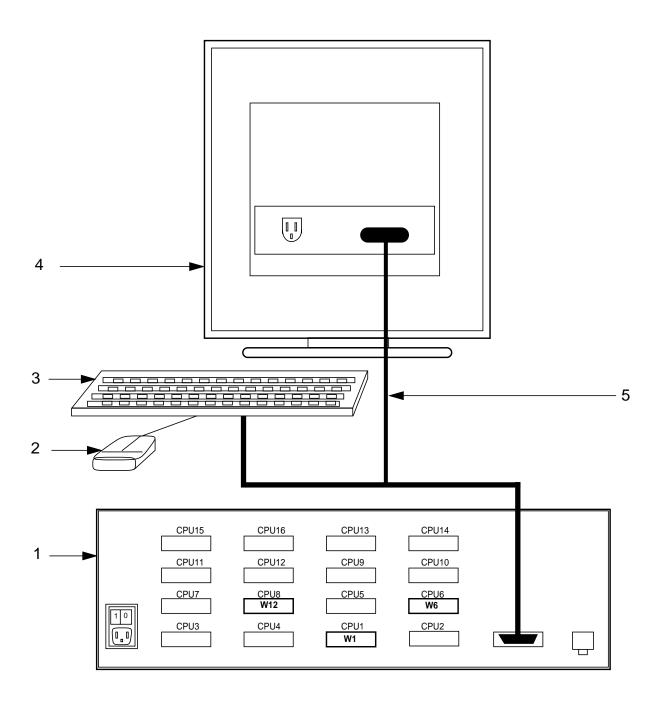
Figure 6-7. Unclassified Console Switch

FIG. & INDEX NO.	PART NUMBER	MFR	DESCRIPTION	REF. DES.
6-7-		1JPW3	. . UNCLASSIFIED CONSOLE SWITCH (See figure 6- 2 for NHA)	U2A2
1	KV5012FA	59951	. . . CONSOLE SWITCH, 12-port	U2A2A1
2	370-1586	7X430	. . . MOUSE	
3	320-1233	7X430	. . . KEYBOARD with cable	
4	365-1020	7X430	. . . MONITOR, 16 in Color	U2A2A2
5	EHN205-050	59951	. . . CABLE, Switch to Monitor/ Keyboard/Mouse, 50 ft	W70
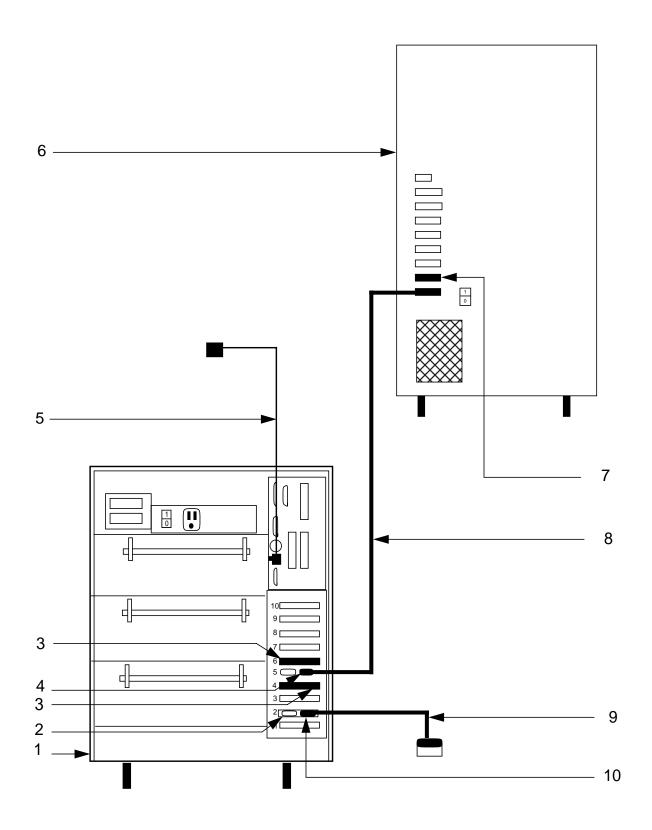
Figure 6-8. Unclassified Archive/Database Server

FIG. & INDEX NO.	PART NUMBER	MFR	DESCRIPTION	REF. DES.
6-8-		1JPW3	. . UNCLASSIFIED ARCHIVE/ DATABASE SERVER (See figure 6- 2 for NHA)	U3A1
1	E450	7X430	. . . SERVER, Ultra Enterprise 450	U3A1A1
2	370-3753	7X430	. . . . PCI CARD, PGX 32 Graphics Frame Buffer	
3	375-0013	7X430	. . . . PCI CARD, Dual Single-Ended Ultra SCSI Controller	
4	6541A	7X430	. . . . CARD, Dual-Channel Differential Ultra SCSI	
5	EVNSL71A w/ 2ea FM733	1JPW3	. . . CABLE, RJ45 10/100 Base-T	W21
6	L3500	7X430	. . . TAPE LIBRARY, StorEdge L3500	U3A1A2
7	150-1890	7X430	. . . . TERMINATOR, Differential SCSI	
8	X3831A	7X430	. . . CABLE, External SCSI, 68-pin, 10M	W22
9	EHN205-020	59951	. . . CABLE, Computer to Console Switch, 20 ft	W12
10	130-4195-01	7X430	. . . ADAPTER	
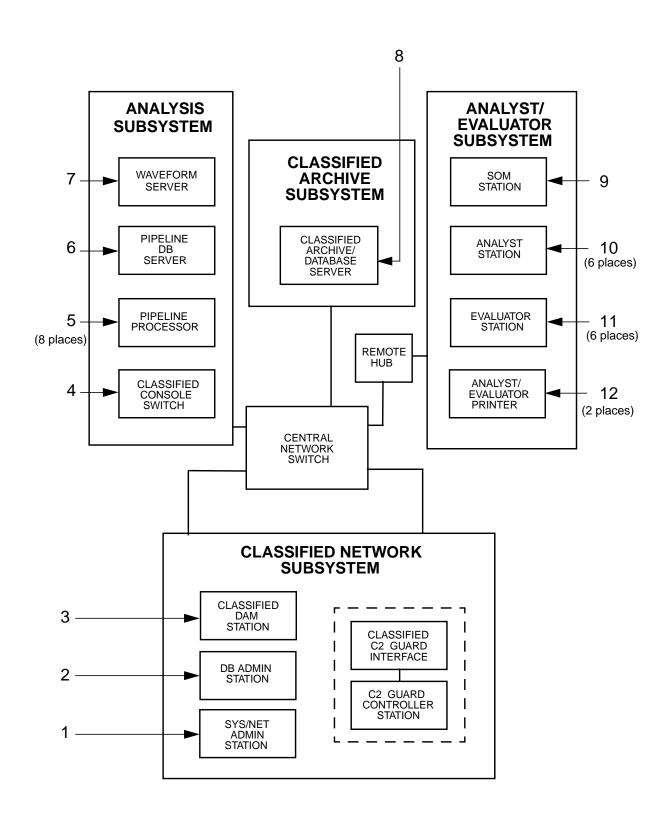
Figure 6-9. US NDC Classified System

FIG. & INDEX NO.	PART NUMBER	MFR	DESCRIPTION	REF. DES.
6-9-		1JPW3	. US NDC CLASSIFIED SYSTEM (See figure 6- 1 for NHA)	C
1		1JPW3	. . SYS/NET ADMIN STATION (See figure 6- 10)	C1A2
2		1JPW3	. . DB ADMIN STATION (See figure 6- 11)	C1A3
3		1JPW3	. . CLASSIFIED DAM STATION (See figure 6- 12)	C1A1
4		1JPW3	. . CLASSIFIED CONSOLE SWITCH (See figure 6- 13)	C2A3
5		1JPW3	. . PIPELINE PROCESSORS (See figure 6- 13, figure 6- 14 and figure 6- 15)	C2A4 thru C2A11
6		1JPW3	. . PIPELINE DB SERVER (See figure 6- 16, figure 6- 17 and figure 6- 18)	C2A2
7		1JPW3	. . WAVEFORM SERVER (See figure 6- 19, figure 6- 20, and figure 6- 21)	C2A1
8		1JPW3	. . CLASSIFIED ARCHIVE/ DATABASE SERVER (See figure 6- 22)	C3A1
9		1JPW3	. . SOM STATION (See figure 6- 23)	C4A1
10		1JPW3	. . ANALYST STATION (See figure 6- 24)	C4A2 thru C4A7
11		1JPW3	. . EVALUATOR STATION (See figure 6- 25)	C4A8 thru C4A13
12		1JPW3	. . ANALYST/EVALUATOR PRINTER (See figure 6- 26)	C4A14 and C4A15

Figure 6-10. Sys/Net Admin Station

FIG. & INDEX NO.	PART NUMBER	MFR	DESCRIPTION	REF. DES.
6-10-		1JPW3	. . SYS/NET ADMIN STATION (See figure 6- 9 for NHA)	C1A2
1	599-2132	7X430	. . . TAPE DRIVE, 8 mm, 7-14 GB	C1A2A3
2	530-2453-01	7X430	. . . CABLE, SCSI, 68-pin, 2 M	W142
3	A21-UFE1A9J-128AG	7X430	. . . WORKSTATION, Ultra 5 Creator	C1A2A1
4	595-4399	7X430	. . . . CARD, SCSI Host Adapter	
5	365-1383	7X430	. . . MONITOR, 21 in Color	C1A2A2
6	530-2357	7X430	. . . ADAPTER, Monitor Cable	
7	EVNSL71A w/2 ea FM733	1JPW3	. . . CABLE, RJ45 10/100 Base-T	W67
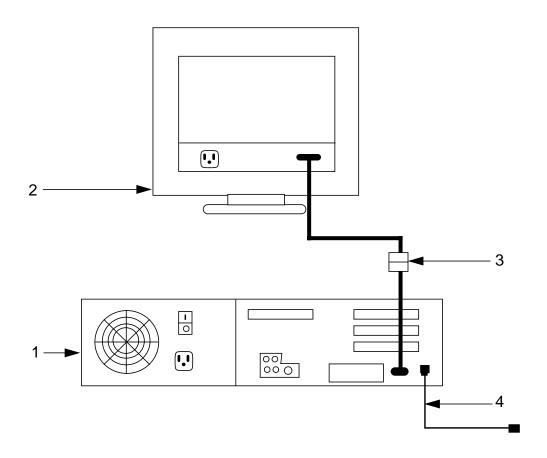
Figure 6-11. DB Admin Station

FIG. & INDEX NO.	PART NUMBER	MFR	DESCRIPTION	REF. DES.
6-11-		1JPW3	. . DB ADMIN STATION (See figure 6- 9 for NHA)	C1A3
1	A21-UFE1A9J-128AG	7X430	. . . WORKSTATION, Ultra 5 Creator	C1A3A1
2	365-1383	7X430	. . . MONITOR, 21 in Color	C1A3A2
3	530-2357	7X430	. . . ADAPTER, Monitor Cable	
4	EVNSL71A w/2 ea FM733	1JPW3	. . . CABLE, RJ45 10/100 Base-T	W68

RIGHT SIDE   LEFT SIDE

4   4

3

2

1

5
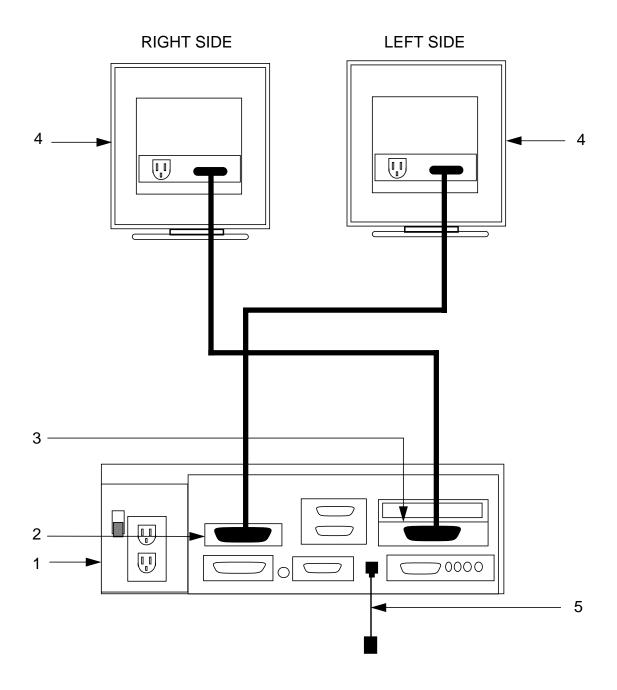
Figure 6-12. Classified DAM Station

FIG. & INDEX NO.	PART NUMBER	MFR	DESCRIPTION	REF. DES.
6-12-		1JPW3	. . CLASSIFIED DAM STATION (See figure 6- 9 for NHA)	C1A1
1	A12-UBA1-1E-128AB	7X430	. . . WORKSTATION, Ultra 1 Creator	C1A1A1
2	501-4127-01	7X430	. . . . CARD, Creator Graphics Frame Buffer	
3	501-2922	7X430	. . . . CARD, Turbo GX Graphics	
4	365-1399	7X430	. . . MONITOR, 21 in Color w/ 13W3 Cable	C1A1A2 & C1A1A3
5	EVNSL71A w/2 ea FM733	1JPW3	. . . CABLE, RJ45 10/100 Base-T	W47
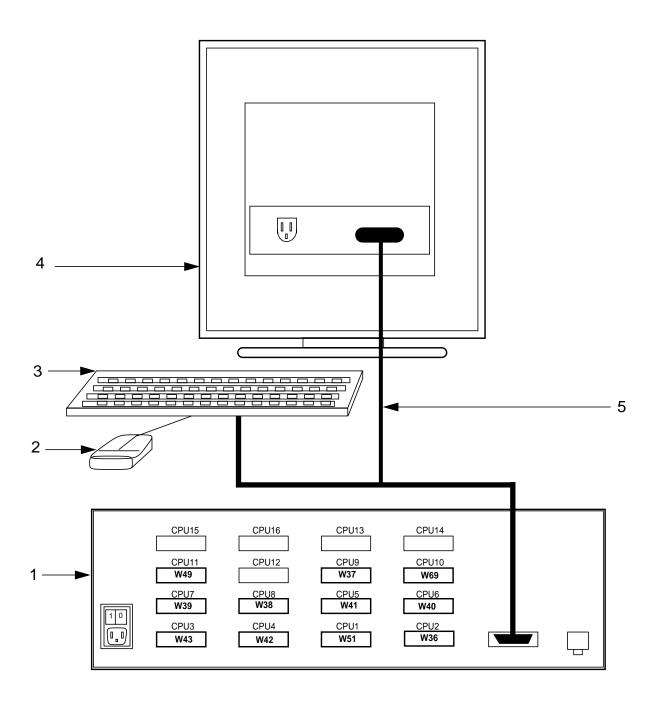
Figure 6-13. Classified Console Switch

FIG. & INDEX NO.	PART NUMBER	MFR	DESCRIPTION	REF. DES.
6-13-		1JPW3	. . CLASSIFIED CONSOLE SWITCH (See figure 6- 9 for NHA)	C2A3
1	KV5012FA	59951	. . . SWITCH, 12-port	C2A3A1
2	370-1586	7X430	. . . MOUSE	
3	320-1233	7X430	. . . KEYBOARD with cable	
4	365-1020	7X430	. . . MONITOR, 16 in Color	C2A3A2
5	EHN205-050	59951	. . . CABLE, Switch to Monitor/ Keyboard/Mouse, 50 ft	W71
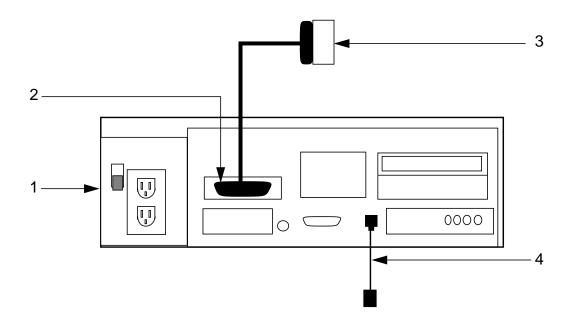
Figure 6-14. Pipeline Processor (pipe1a through pipe7a) (Rear View)

FIG. & INDEX NO.	PART NUMBER	MFR	DESCRIPTION	REF. DES.
6-14-		1JPW3	. . PIPELINE PROCESSOR (pipe1a through pipe7a) (Rear View) (See figure 6- 9 for NHA)	C2A4 THRU C2A11
1	A12-UBA1-1E-128AB	7X430	. . . PROCESSOR, Ultra 1 Creator 3D	C2A4A1 thru C2A11A1
2	501-4126	7X430	. . . . CARD, Creator 3D Graphics Frame Buffer	
3	EHN-205-005	7X430	. . . CABLE, Computer to Console Switch, 5 ft	W37 thru W43
4	EVNSL71A w/2 ea FM733	1JPW3	. . . CABLE, RJ45 10/100 Base-T	W29 thru W35
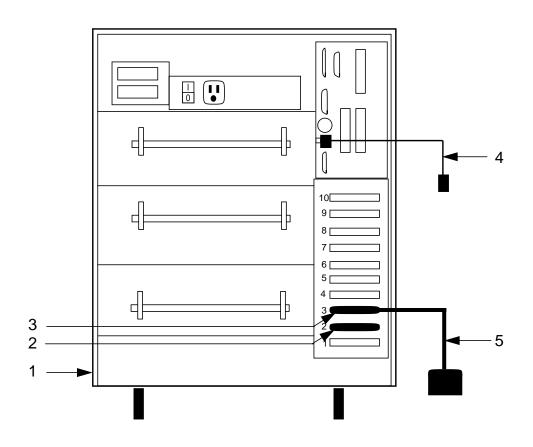
Figure 6-15. Pipeline Processor (pipe8a) (Rear View)

FIG. & INDEX NO.	PART NUMBER	MFR	DESCRIPTION	REF. DES.
6-15-		1JPW3	. . . PIPELINE PROCESSOR (pipe8a) (Rear View) (See figure 6- 9 for NHA)	C2A11
1	E450	7X430	. . . PROCESSOR, Ultra Enterprise 450	C2A11A1
2	375-0013	7X430	. . . . PCI CARD, Dual Single-Ended Ultra SCSI Controller	
3	370-3753	7X430	. . . . PCI CARD, PGX Graphics Frame Buffer, 8-bit	
4	EVNSL71A w/ 2ea FM733	1JPW3	. . . CABLE, RJ45 10/100 Base-T	W26
5	EHN205-020	59951	. . . CABLE, Computer to Console Switch, 20 ft	W69
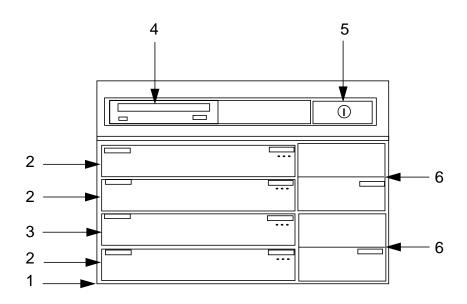
Figure 6-16. Pipeline DB Server (Front View)

FIG. & INDEX NO.	PART NUMBER	MFR	DESCRIPTION	REF. DES.
6-16-		1JPW3	. . PIPELINE DB SERVER (Front View) (See figure 6- 9 for NHA)	C2A2
1	600-4583-02 (MDL 4002-MR3)	7X430	. . . E4000 SERVER BASE UNIT	C2A2A1
2	501-4312	7X430	. . . . BOARD, CPU/Memory, 3 ea, 1 GB	
3	501-4882	7X430	. . . . BOARD, CPU/Memory, 1 ea, 0.5 GB	
4	370-2817-02	7X430	. . . . CD-ROM, CD12	
5	370-1810	7X430	. . . . ASSEMBLY, Key Switch	
6	300-1260-03	7X430	. . . . MODULE, Power Cooling, 300W	
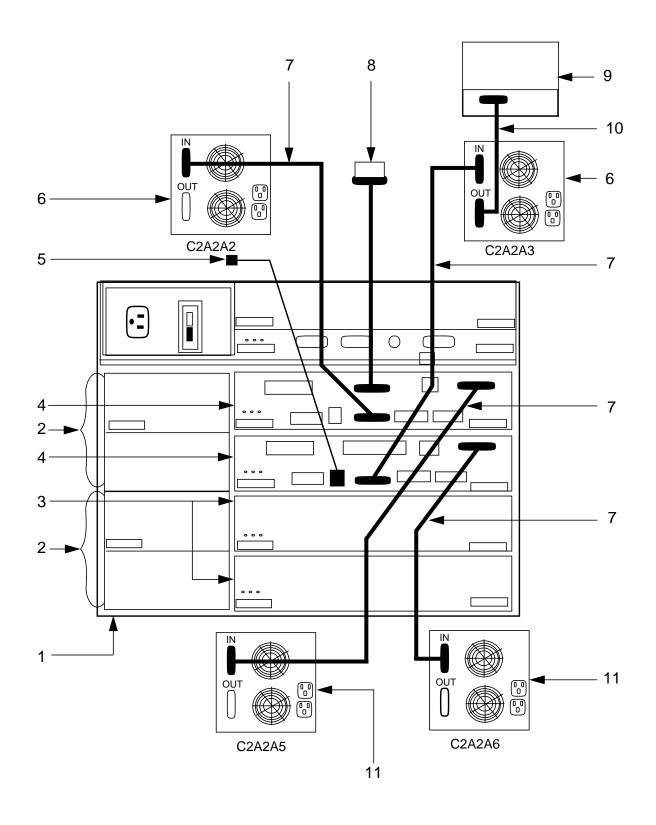
Figure 6-17. Pipeline DB Server (Rear View)

FIG. & INDEX NO.	PART NUMBER	MFR	DESCRIPTION	REF. DES.
6-17-		1JPW3	. . PIPELINE DB SERVER (Rear View) (See figure 6- 9 for NHA)	C2A2
1	600-4583-02 (MDL 4002-MR3)	7X430	. . . E4000 SERVER BASE UNIT	C2A2A1
2	300-1260-03	7X430	. . . MODULE, Power Cooling, 300W	
3	540-2592	7X430	. . . . BOARD, Filler Panel	
4	501-4287-01	7X430	. . . . BOARD, SBus I/O (see figure 6- 8)	
5	EVNSL71A w/ 2ea FM733	1JPW3	. . . CABLE, RJ45 10/100 Base-T	W28
6	595-4451	7X430	. . . SPARCSTORAGE MULTIPACK 2	C2A2A2 & C2A2A3
7	530-1884	7X430	. . . CABLE, External SCSI	W106, W126 & W128
8	ENH205-020	59951	. . . CABLE, Computer to Console Switch, 20 ft	W36
9	X6060A	7X430	. . . DRIVE, External Tape, DLT-35-70	C2A2A4
10	530-2383-01	7X430	. . . CABLE, External SCSI	W127
11	595-4280-02 (MDL X5514A)	7X430	. . . SPARCSTORAGE MULTIPACK	C2A2A5 & C2A2A6
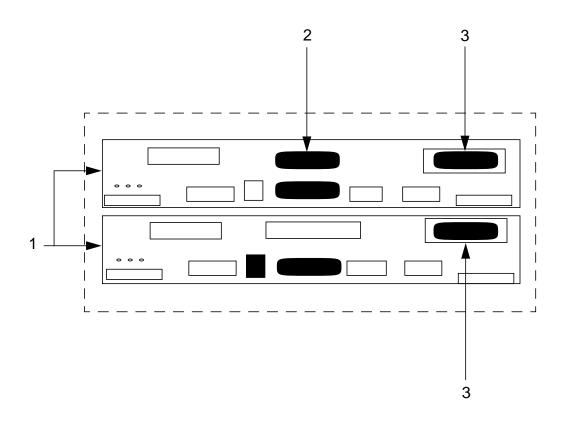
Figure 6-18. Pipeline DB Server E4000 SBus I/O Boards (Rear Panels)

FIG. & INDEX NO.	PART NUMBER	MFR	DESCRIPTION	REF. DES.
6-18-		1JPW3	. . PIPELINE DB SERVER E4000 SBus I/O Boards (Rear Panels) (See figure 6- 17 for NHA)	
1	501-4287-01	7X430	. . . BOARD, SBus I/O	
2	501-2325	7X430	. . . . CARD, Turbo GX Graphics	
3	501-2739	7X430	. . . . CARD, Single-ended fast/wide SCSI	
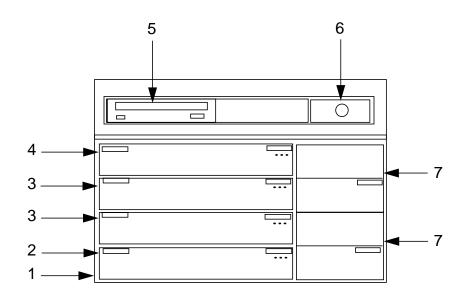
Figure 6-19. Waveform Server E4000 (Front View)

FIG. & INDEX NO.	PART NUMBER	MFR	DESCRIPTION	REF. DES.
6-19-		1JPW3	. . WAVEFORM SERVER (Front View)	C2A1
1	600-4583-02 (MDL 4002-MR3)	7X430	. . . E4000 SERVER BASE UNIT	C2A1A1
2	540-2592	7X430	. . . . BOARD, Filler Panel	
3	501-4312	7X430	. . . . BOARD, CPU/Memory, 2 ea, 1 GB	
4	501-4882	7X430	. . . . BOARD, CPU/Memory, 1 ea, 0.5 GB	
5	370-2817-02	7X430	. . . . CD-ROM, CD12	
6	370-1810	7X430	. . . . ASSEMBLY, Key Switch	
7	300-1260-03	7X430	. . . . MODULE, Power Cooling, 300W	
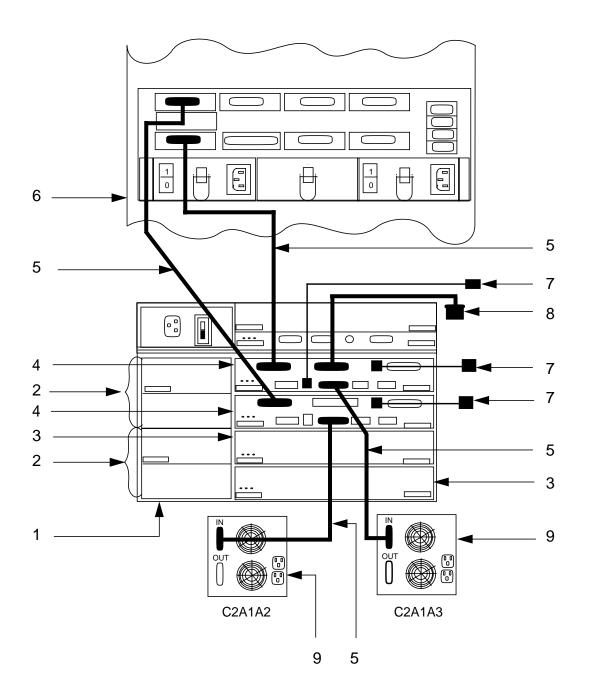
Figure 6-20. Waveform Server (Rear View)

FIG. & INDEX NO.	PART NUMBER	MFR	DESCRIPTION	REF. DES.
6-20-		1JPW3	. . WAVEFORM SERVER (Rear View) (See figure 6- 9 for NHA)	C2A1
1	600-4583-02 (MDL 4002-MR3)	7X430	. . . E4000 SERVER BASE UNIT	C2A1A
2	300-1260-03	7X430	. . . MODULE, Power Cooling, 300W	
3	540-2592	7X430	. . . . BOARD, Filler Panel	
4	501-4287-01	7X430	. . . . BOARD, SBus I/O (see figure 6-20)	
5	530-2383-01	7X430	. . . CABLE, External SCSI	W129, W130, W131 & W132
6	SG-ARY391A-364G	7X430	. . . DISK ARRAY, STOREDGE A3500	C2A1A4
7	EVNSL71A w/ 2ea FM 733	1JPW3	. . . CABLE, RJ45 10/100 Base-T	W24, W27, & W44
8	EHN205-020	59951	. . . CABLE, Computer to Console Switch, 20 ft	W51
9	595-4280-02 (MDL X5514A)	7X430	. . . SPARCSTORAGE MULTIPACK	C2A1A2 & C2A1A3
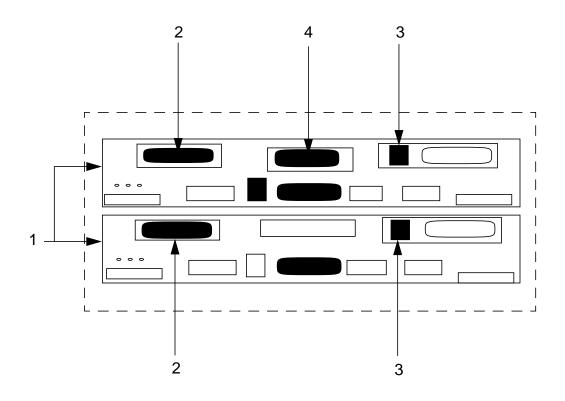
Figure 6-21. Waveform Server E4000 SBus I/O Boards (Rear Panels)

FIG. & INDEX NO.	PART NUMBER	MFR	DESCRIPTION	REF. DES.
6-21-		1JPW3	. . WAVEFORM SERVER E4000 SBUS I/O BOARDs (Rear Panels) (See figure 6- 20 for NHA)	
1	501-4287-01	7X430	. . . BOARD, SBus I/O	
2	370-2443	7X430	. . . . CARD, Differential SCSI	
3	501-2919	7X430	. . . . CARD, Sun Fast Ethernet	
4	501-2325	7X430	. . . . CARD, Turbo GX Graphics	
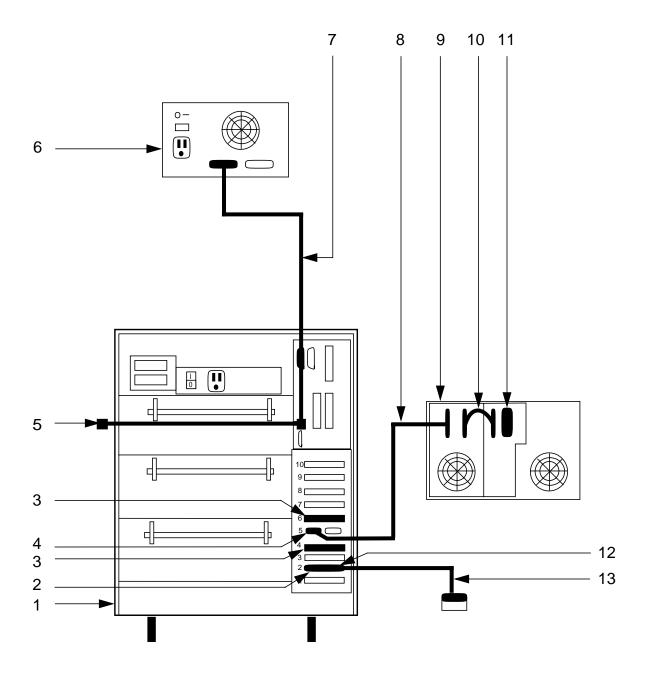
Figure 6-22. Classified Archive/Database Server (Rear View)

FIG. & INDEX NO.	PART NUMBER	MFR	DESCRIPTION	REF. DES.
6-22-		1JPW3	. . CLASSIFIED ARCHIVE/ DATABASE SERVER (Rear View) (See figure 6- 9 for NHA)	C3A1
1	E450	7X430	. . . SERVER, Ultra Enterprise 450	C3A1A1
2	370-3753	7X430	. . . . PCI CARD, PGX 32 Graphics Frame Buffer	
3	375-0013	7X430	. . . . PCI CARD, Dual Single-Ended Ultra SCSI Controller	
4	6541A	7X430	. . . . CARD, Dual-Channel Differential Ultra SCSI	
5	EVNSL71A w/ 2ea FM733	1JPW3	. . . CABLE, RJ45 10/100 Base-T	W25
6	X6060A	7X430	. . . TAPE DRIVE, External, DLT 7000	
7	530-2383-01	7X430	. . . CABLE, External SCSI	W48
8	530-2352	7X430	. . . CABLE, External SCSI, 68-pin, 4M	W50
9	L280	7X430	. . . TAPE DRIVE, StorEdge L280	C3A1A2
10	530-2649	7X430	. . . . CABLE, Jumper	
11	150-1890	7X430	. . . . TERMINATOR, Differential SCSI, 68-pin	
12	130-4195-01	7X430	. . . ADAPTER	
13	EHN205-020	59951	. . . CABLE, Computer to Console Switch, 20 ft	W49

RIGHT SIDE   LEFT SIDE
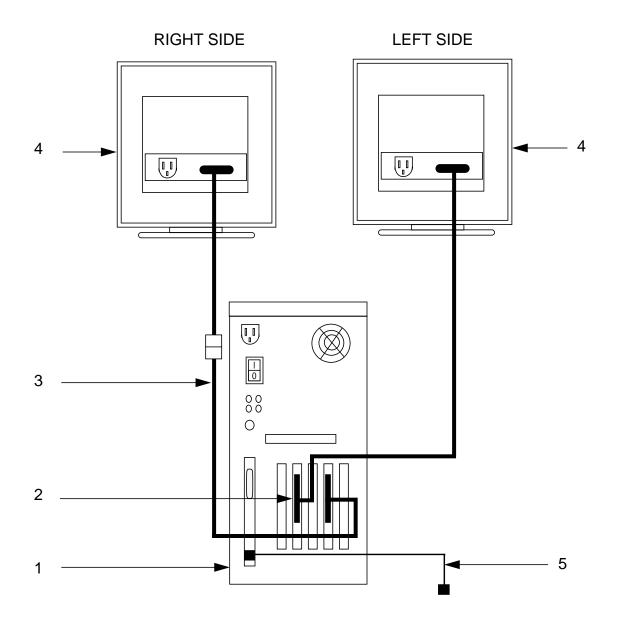
Figure 6-23. SOM Station (Rear View)

FIG. & INDEX NO.	PART NUMBER	MFR	DESCRIPTION	REF. DES.
6-23-		1JPW3	. . SOM STATION (Rear View) (See figure 6- 9 for NHA)	C4A1
1	A22UKC1A9P-C512	7X430	. . . WORKSTATION, Ultra 10 Creator	C4A1A1
2	370-2256	7X430	. . . . CARD, PGX Color Frame Buffer	
3	530-2357	7X430	. . . ADAPTER, Monitor Cable	
4	365-1335	7X430	. . . MONITOR, 20 in Color w/ 13W3 Cable	
5	EVNSL71A w/2 ea FM733	1JPW3	. . . CABLE, RJ45 10/100 Base-T	W66

RIGHT SIDE   LEFT SIDE

4 →   ← 4

3 →

2

1

5

Figure 6-24. Analyst Station (Rear View)

FIG. & INDEX NO.	PART NUMBER	MFR	DESCRIPTION	REF. DES.
6-24-		1JPW3	. . ANALYST STATION (Rear View) (See figure 6- 9 for NHA)	C4A2 thru C4A7
1	A22UKC1A9P-C512	7X430	. . . WORKSTATION, Ultra 10 Creator	C4A2A1 thru C4A7A1
2	370-2256	7X430	. . . . CARD, PGX Color Frame Buffer	
3	530-2357	7X430	. . . ADAPTER, Monitor Cable	
4	365-1399	7X430	. . . MONITOR, 21 in Color w/ 13W3 Cable	
5	EVNSL71A w/2 ea FM733	1JPW3	. . . CABLE, RJ45 10/100 Base-T	W59 thru w64

RIGHT SIDE   LEFT SIDE

4

4

3

2

1

5
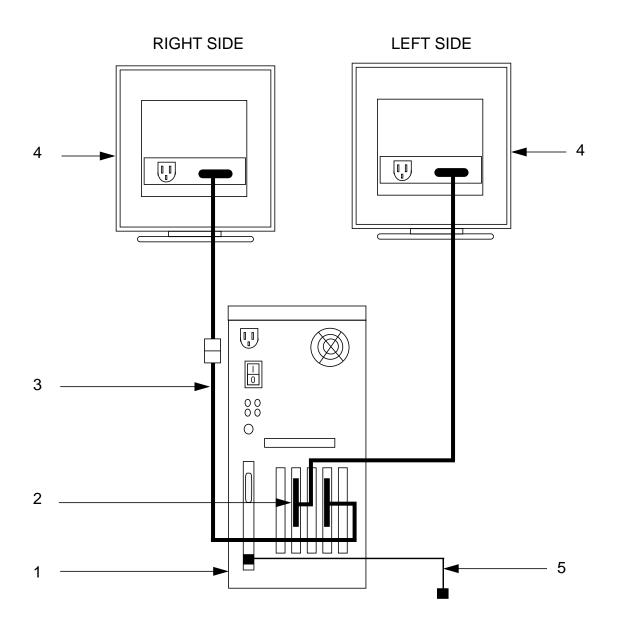
Figure 6-25. Evaluator Station (Rear View)

FIG. & INDEX NO.	PART NUMBER	MFR	DESCRIPTION	REF. DES.
6-25-		1JPW3	. . EVALUATOR STATION (Rear View) (See figure 6- 9 for NHA)	C4A8 thru C4A13
1	A22UKC1A9P-C512	7X430	. . . WORKSTATION, Ultra 10 Creator	C4A8A1 thru C4A13A1
2	370-2256	7X430	. . . . CARD, PGX Color Frame Buffer	
3	530-2357		. . . ADAPTER, Monitor Cable	
4	365-1399	7X430	. . . MONITOR, 21 in Color w/ 13W3 Cable	
5	EVNSL71A w/2 ea FM733	1JPW3	. . . CABLE, RJ45 10/100 Base-T	W53 thru W57 and W65
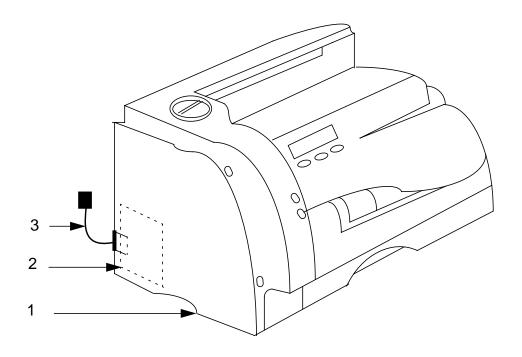
Figure 6-26. Analyst/Evaluator Printer

FIG. & INDEX NO.	PART NUMBER	MFR	DESCRIPTION	REF. DES.
6-26-		1JPW3	. . ANALYST/EVALUATOR B/W PRINTER (See figure 6-9 for NHA)	C4A14 & C4A15
1	43J2600 (Optra S 1625)	None	. . . PRINTER, Laser, model Optra S 1625	
2	99A0421	05487	. . . CARD, Internal Network Adapter Option	
3	EVNSL71A w/2 ea FM733	1JPW3	. . . CABLE, RJ45 10/100 Base-T	W52 & W58

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CHAPTER 7

CIRCUIT DIAGRAMS

7-1.   INTRODUCTION.

7-2.   Chapter 7 provides the United States National Data Center (US NDC) System Wire List, System Interconnection Diagram, Equipment Location Diagrams, the Hardware Connectivity Diagram, and the Computer Room AC Power Distribution Diagram. The diagrams and wire list support the maintenance and operation of both the Classified and Unclassified Systems.

7-3.   GENERAL.

7-4.   US NDC WIRE LIST AND CABLING DIAGRAMS.

7-5.   Table 7-1 provides a listing of the signal cables used in the US NDC System. The CABLE NO. column identifies the reference designation (REF. DES.) for the cable listed. The PART NUMBER column identifies the part number for the cable and the DESCRIPTION column describes the cable type. The FROM and TO columns identify the point-to-point connection for each cable. The Data Cable Interconnection Diagram in figure 7-1 illustrates the system external data cable interconnections. The SCSI Cable Interconnection Diagram (figure 7-2) illustrate the external SCSI cable interconnections between subsystem assemblies and peripherals.

Table 7-1. US NDC Cable List

CABLE NO.	PART NUMBER	DESCRIPTION	FROM (REF. DES.)	TO (REF. DES.)
W1	EHN205-020	Computer to Switch Cable 20 ft	Console Switch (U2A2A1J2)	dlsa (U2A1A1J2)
W2 through W5	Not Used	Not Used	Not Used	Not Used
W6	ENH205-010	Computer to Switch Cable 10 ft	Console Switch (U2A2A1J1)	ndcadmin (U1A2A1J2)
W7	Not Used	Not Used	Not Used	Not Used
W8	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 4 ft	dlsa (U2A1A1J3)	TX Diode (J1)

Table 7-1. US NDC Cable List (Cont)

CABLE NO.	PART NUMBER	DESCRIPTION	FROM (REF. DES.)	TO (REF. DES.)
W9	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 4 ft	ndcadmin (U1A2A1J1)	cat5000 (J19)
W10	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 5 ft	udam (U1A1A1J1)	Media Converter (J1)
W11	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 5 ft	Media Converter (J1)	usysadmin (U1A3A1J1)
W12	EHN205-020	Computer to Switch Cable 20 ft	Console Switch (U2A2A1J3)	uarch (U3A1A1J2)
W13	Not Used	Not Used	Not Used	Not Used
W14	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 20 ft	dlsa (U2A1A1J1)	cat5000 (J1)
W15 through W20	Not Used	Not Used	Not Used	Not Used
W21	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 20 ft	uarch (U3A1A1J1)	cat5000 (J10)
W22	530-2455-01	SCSI Cable	uarch (U3A1A1J3)	L3500 (U3A1A2J1)
W23	Not Used	Not Used	Not Used	Not Used
W24	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 4 ft	wfsa (C2A1A1J3)	RX-diode (J1)
W25	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable15 ft	cat5000 (J22)	carch (C3A1A1J1)
W26	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 15 ft	cat5000 (J11)	pipe8a (C2A11A1J1)
W27	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 20 ft	cat5000 (J20)	wfsa (C2A1A1J1)
W28	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 20 ft	cat5000 (J18)	cdbsa (C2A2A1J1)
W29	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 20 ft	cat5000 (J10)	pipe7a (C2A10A1J1)

Table 7-1. US NDC Cable List (Cont)

CABLE NO.	PART NUMBER	DESCRIPTION	FROM (REF. DES.)	TO (REF. DES.)
W30	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 20 ft	cat5000 (J9)	pipe6a (C2A9A1J1)
W31	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 20 ft	cat5000 (J8)	pipe5a (C2A8A1J1)
W32	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 20 ft	cat5000 (J7)	pipe4a (C2A7A1J1)
W33	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 20 ft	cat5000 (J6)	pipe3a (C2A6A1J1)
W34	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 15 ft	cat5000 (J5)	pipe2a (C2A5A1J1)
W35	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 15 ft	cat5000 (J4)	pipe1a (C2A4A1J1)
W36	ENH205-020	Computer to Switch Cable 20 ft	cdbsa (C2A2A1J2)	Console Switch (C2A3A1J2)
W37	EHN205-005	Computer to Switch Cable 5 ft	pipe7a (C2A10A1J2)	Console Switch (C2A3A1J9)
W38	EHN205-005	Computer to Switch Cable 5 ft	pipe6a (C2A9A1J2)	Console Switch (C2A3A1J8)
W39	EHN205-005	Computer to Switch Cable 5 ft	pipe5a (C2A8A1J2)	Console Switch (C2A3A1J7)
W40	EHN205-010	Computer to Switch Cable 10 ft	pipe4a (C2A7A1J2)	Console Switch (C2A3A1J6)
W41	EHN205-010	Computer to Switch Cable 10 ft	pipe3a (C2A6A1J2)	Console Switch (C2A3A1J5)
W42	EHN205-010	Computer to Switch Cable 15 ft	pipe2a (C2A5A1J2)	Console Switch (C2A3A1J4)

Table 7-1. US NDC Cable List (Cont)

CABLE NO.	PART NUMBER	DESCRIPTION	FROM (REF. DES.)	TO (REF. DES.)
W43	EHN205-010	Computer to Switch Cable 10 ft	pipe1a (C2A4A1J2)	Console Switch (C2A3A1J3)
W44	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 100 ft	wfsa (C2A1A1J8)	AFTAC RPC5 (J1)
W45 through W46	Not Used	Not Used	Not Used	Not Used
W47	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 50 ft	cdam (C1A1A1J1)	Fast Hub300 (J14)
W48	530-1884	SCSI Cable	DLT Tape Drive (C3A1A3J1)	carch (C3A1A3J4)
W49	EHN205-020	Computer to Switch Cable 20 ft	carch (C3A1A1J2)	Console Switch (C2A3A1J11)
W50	530-2352	SCSI Cable	carch (C3A1A1J3)	L280 Tape Drive (C3A1A2J1)
W51	EHN205-020A w	Computer to Switch Cable 20 ft	wfsa (C2A1A1J2)	Console Switch (C2A3A1J1)
W52	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 40 ft	eval-lp (C4A14A1J1)	Fast Hub300 (J12)
W53	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 40 ft	eval1 (C4A9A1J1)	Fast Hub300 (J5)
W54	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 40 ft	eval2 (C4A10A1J1)	Fast Hub300 (J6)
W55	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 40 ft	eval3 (C4A11A1J1)	Fast Hub300 (J7)
W56	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 40 ft	eval4 (C4A12A1J1)	Fast Hub300 (J8)
W57	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 40 ft	eval5 (C4A13A1J1)	Fast Hub300 (J9)

Table 7-1. US NDC Cable List (Cont)

CABLE NO.	PART NUMBER	DESCRIPTION	FROM (REF. DES.)	TO (REF. DES.)
W58	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 40 ft	aoc-lp (C4A15A1J1)	Fast Hub300 (J1)
W59	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 40 ft	analyst1 (C4A2A1J1)	Fast Hub300 (J4)
W60	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 40 ft	analyst2 (C4A3A1J1)	Fast Hub300 (J5)
W61	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 40 ft	analyst3 (C4A4A1J1)	Fast Hub300 (J6)
W62	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 40 ft	analyst4 (C4A5A1J1)	Fast Hub300 (J7)
W63	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 40 ft	analyst5 (C4A6A1J1)	Fast Hub300 (J8)
W64	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 40 ft	analyst6 (C4A7A1J1)	Fast Hub300 (J9)
W65	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 40 ft	eval6 (C4A16A1J1)	Fast Hub300 (J10)
W66	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 40 ft	som1 (C4A1A1J1)	Fast Hub300 (J13)
W67	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 5 ft	Media Converter (J1)	sysadmin (C1A2A1J1)
W68	EVNSL71A w 2ea FM733	Shielded RJ45 Ethernet Cable 5 ft	Media Converter (J1)	dbadmin (C1A3A1J1)
W69	EHN205-020	Computer to Switch Cable 20 ft	pipe8a (C2A11A1J2)	Console Switch (C2A3A1J10)
W70	EHN205-050	Console Switch Cable 50 ft	Console Switch (U2A2A1J13)	Console Monitor (U2A2A2J1)
W71	EHN205-050	Console Switch Cable 50 ft	Console Switch (C2A3A1J13)	Console Monitor (C2A3A2J1)

Table 7-1. US NDC Cable List (Cont)

CABLE NO.	PART NUMBER	DESCRIPTION	FROM (REF. DES.)	TO (REF. DES.)
W72 through W105	Not Used	Not Used	Not Used	Not Used
W106	530-1884-03	SCSI Cable	SPARC MultiPack (C2A2A5J1)	cdbsa (C2A2A1J5)
W107	530-2115-02	SCSI Cable	SPARC MultiPack (C2A2A6J1)	cdbsa (C2A2A1J4)
W108 through W125	Not Used	Not Used	Not Used	Not Used
W126	530-1884-03	SCSI Cable	SPARC MultiPack (C2A2A3J1)	cdbsa (C2A2A1J6)
W127	530-2383-01	SCSI Cable	DLT Drive (C2A2A4J1)	SPARC MultiPack (C2A2A3J2)
W128	530-2383-01	SCSI Cable	SPARC MultiPack (C2A2A2J1)	cdbsa (C2A2A1J7)
W129	530-2383-01	SCSI Cable	SPARC MultiPack (C2A1A3J1)	wfsa (C2A1A1J4)
W130	530-2383-01	SCSI Cable	SPARC MultiPack (C2A1A2J1)	wfsa (C2A1A1J5)
W131	530-1886-01	SCSI Cable	wfsa (C2A1A1J6)	StorEdge3000 (C2A1A4J2)
W132	530-1886-01	SCSI Cable	wfsa (C2A1A1J7)	StorEdge3000 (C2A1A4J1)
W133 through W140	Not Used	Not Used	Not Used	Not Used

Table 7-1. US NDC Cable List (Cont)

CABLE NO.	PART NUMBER	DESCRIPTION	FROM (REF. DES.)	TO (REF. DES.)
W141	530-2453	SCSI Cable	8mm Tape Drive (U1A3A5J1)	usysadmin (U1A3A1J2)
W142	530-2453	SCSI Cable	8mm Tape Drive (C1A3A5J1)	sysadmin (C1A2A1J2)

7-6.   HARDWARE CONNECTIVITY DIAGRAM.

7-7.   The hardware connectivity diagram provides pictorial blocks and overall connectivity of the major hardware configuration items for both the Unclassified and Classified Systems including the system network interfaces. The connectivity diagrams are shown in shown in figure 7-1, figure 7-2, and figure 7-3. The computer area AC Power Distribution Diagram is shown in figure 7-4.

7-8.   EQUIPMENT LOCATION DIAGRAMS.

7-9.   The equipment location diagrams identify the US NDC equipment in the Analyst/ Evaluator area and the computer room. The computer room rack locations are shown in figure 7-5. The individual rack equipment descriptions are provided in figure 7-6 through figure 7-14 accompanied by associated tables to identify the contained equipment.

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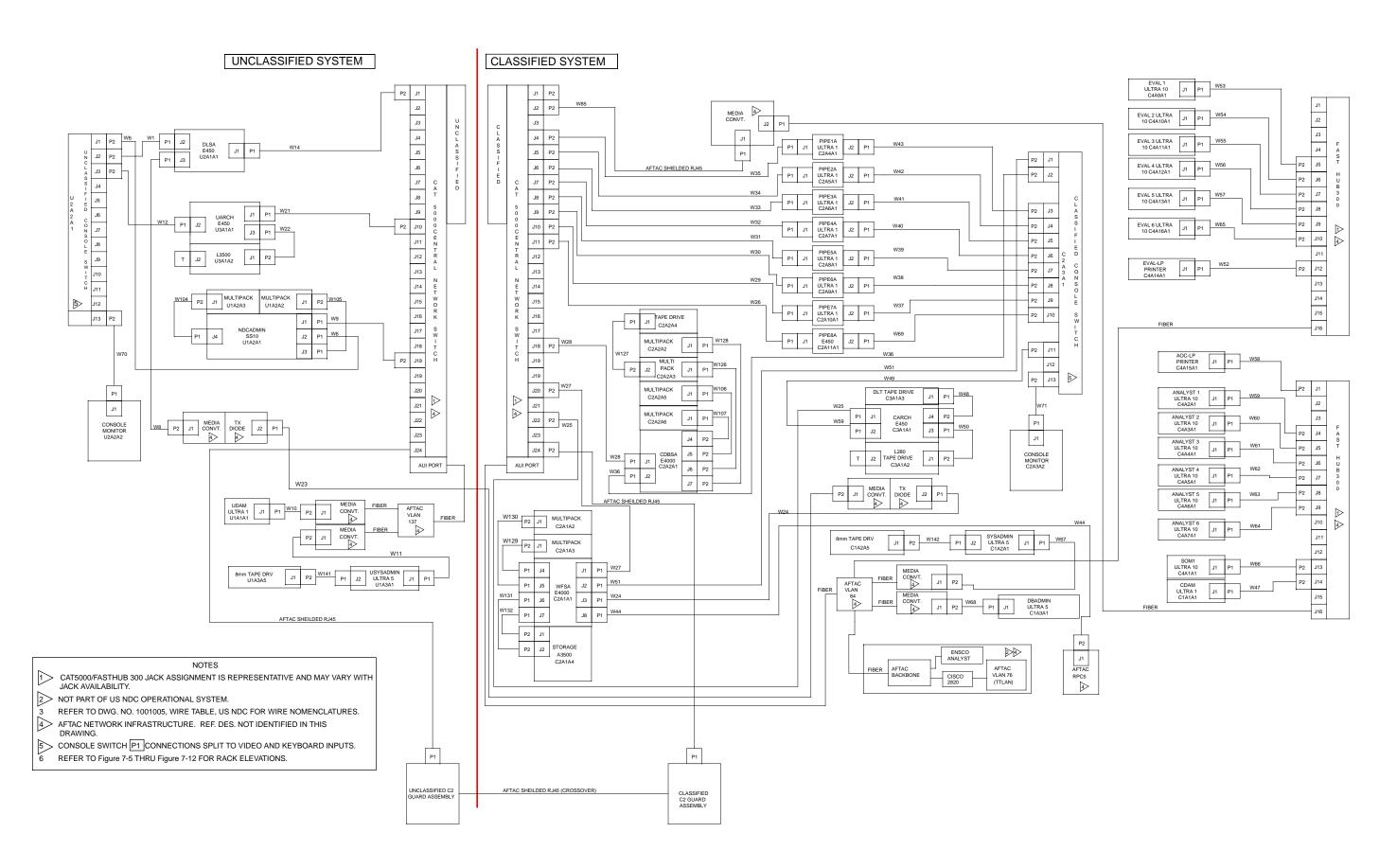
Figure 7-1. US NDC Data Cable Interconnection Diagram

7-9/7-10
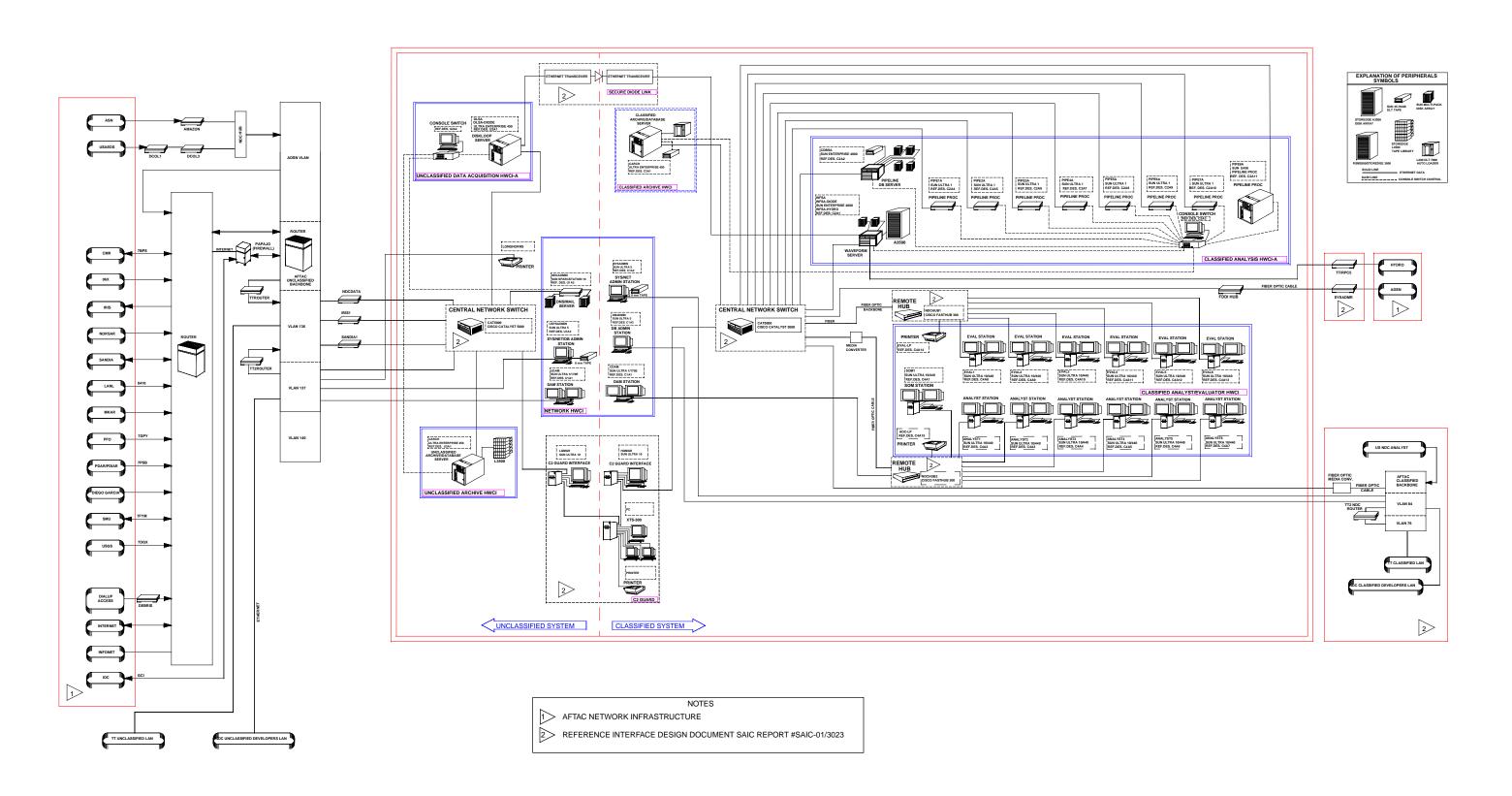
Figure 7-2. US NDC System Connectivity Diagram

Figure 7-3. US NDC Computer Area AC Power Distribution Diagram
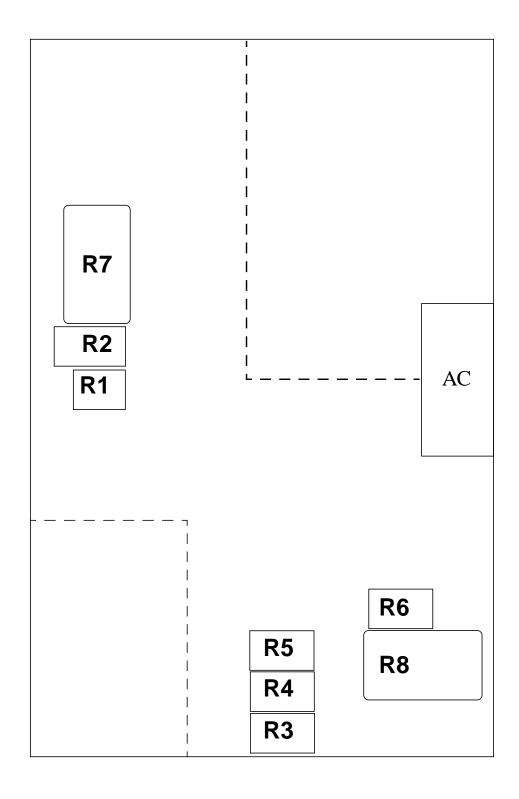
Figure 7-4. US NDC Computer Area Rack Identification

KEY	DESCRIPTION
R1	Rack 1 Equipment (See figure 7-5.)
R2	Rack 2 Equipment (See figure 7-6.)
R3	Rack 3 Equipment (See figure 7-7.)
R4	Rack 4 Equipment (See figure 7-8.)
R5	Rack 5 Equipment (See figure 7-9.)
R6	Rack 6 Equipment (See figure 7-10.)
R7	Rack 7 Equipment (See figure 7-11.)
R8	Rack 8 Equipment (See figure 7-12.)
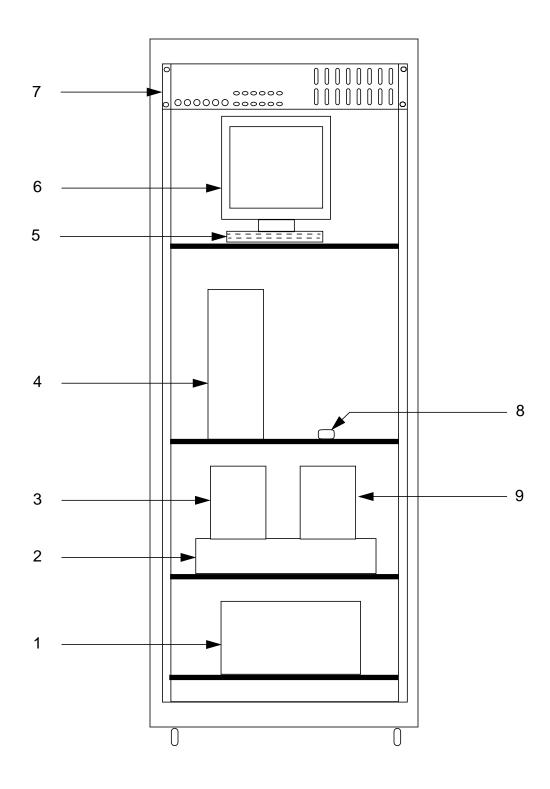
Figure 7-5. Rack 1 Equipment

KEY	DESCRIPTION	REF. DES.
1	CISCO Catalyst 5000	U1A4A1
2	SPARCstation 10	U1A2A1
3	SPARCstorage MultiPack	U1A2A2
4	Ultra 10	U1A5A1
5	Keyboard	U1A5A3
6	Monitor, 19 in	U1A5A2
7	Console Switch	U2A2A1
8	Mouse	U1A5A4
9	SPARCstorage MultiPack	U1A2A3

1 ⟶
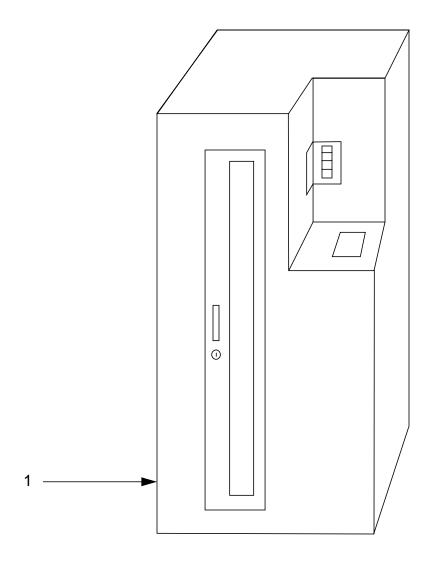
Figure 7-6. Rack 2 Equipment

KEY	DESCRIPTION	REF. DES.
1	StorEdge L3500	U3A1A2
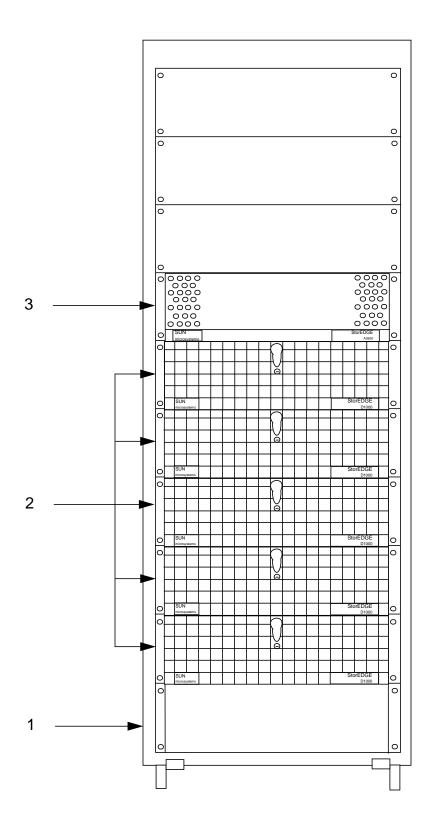
Figure 7-7. Rack 3 Equipment

KEY	DESCRIPTION	REF. DES.
1	Waveform Server	C2A1
2	StorEdge D1000	
3	StorEdge A3500	C2A1A4
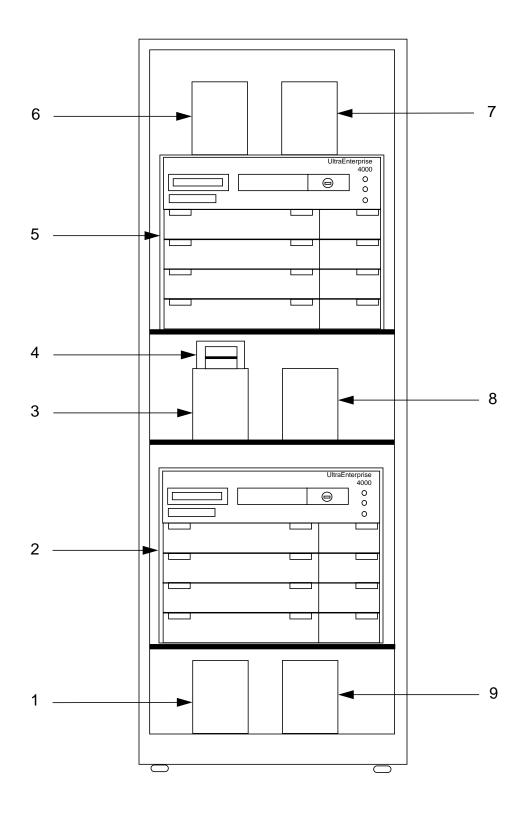
Figure 7-8. Rack 4 Equipment

KEY	DESCRIPTION	REF. DES.
1	SPARCstorage MultiPack	C2A2A6
2	Ultra Enterprise 4000	C2A2A1
3	SPARCstorage MultiPack 2	C2A2A3
4	External Tape Drive 35-70 DLT7000	C2A2A4
5	Ultra Enterprise 4000	C2A1A1
6	SPARCstorage MultiPack	C2A1A3
7	SPARCstorage MultiPack	C2A1A2
8	SPARCstorage MultiPack 2	C2A2A2
9	SPARCstorage MultiPack	C2A2A5
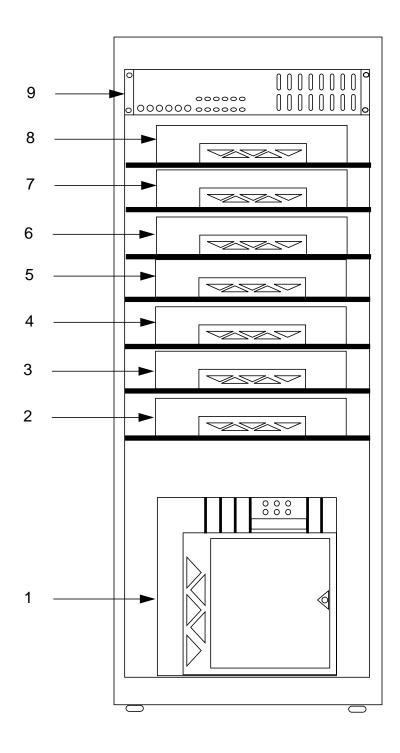
Figure 7-9. Rack 5 Equipment

KEY	DESCRIPTION	REF. DES.
1	Ultra Enterprise 450	C2A11A1
2	Ultra 1 Creator Station	C2A4A1
3	Ultra 1 Creator Station	C2A5A1
4	Ultra 1 Creator Station	C2A6A1
5	Ultra 1 Creator Station	C2A7A1
6	Ultra 1 Creator Station	C2A8A1
7	Ultra 1 Creator Station	C2A9A1
8	Ultra 1 Creator Station	C2A10A1
9	Console Switch	C2A3A1
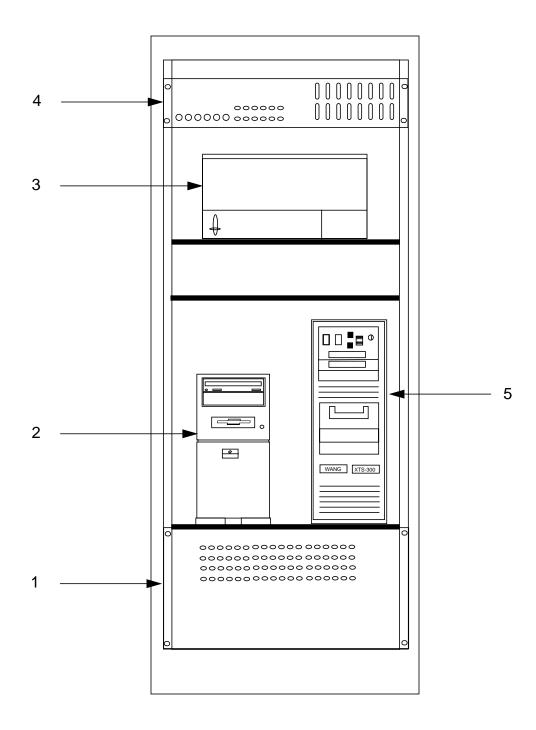
Figure 7-10. Rack 6 Equipment

KEY	DESCRIPTION	REF. DES.
1	CISCO Catalyst 5000	C1A6A1
2	Ultra 10 Workstation	C1A4A1
3	HP Laserjet 4000 Printer	C1A5A8
4	FDDI Hub	N/A
5	XTS300 PC	C1A5A1
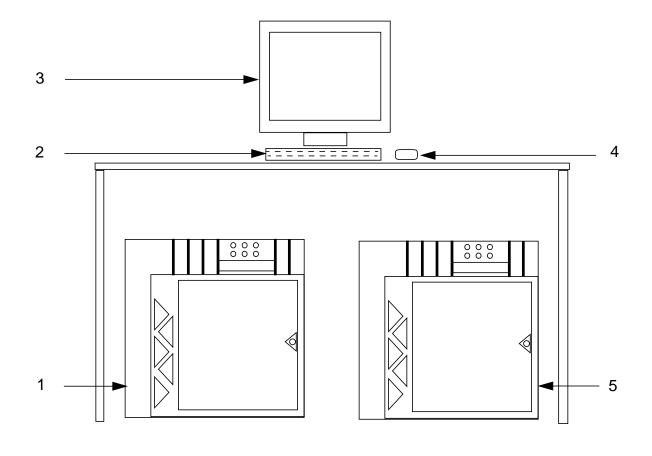
Figure 7-11. Rack 7 Equipment

KEY	DESCRIPTION	REF. DES.
1	Ultra Enterprise 450	U3A1A1
2	Keyboard	U2A2A3
3	Monitor, 20 in	U2A2A2
4	Mouse	U2A2A4
5	Ultra Enterprise 450	U2A1A1
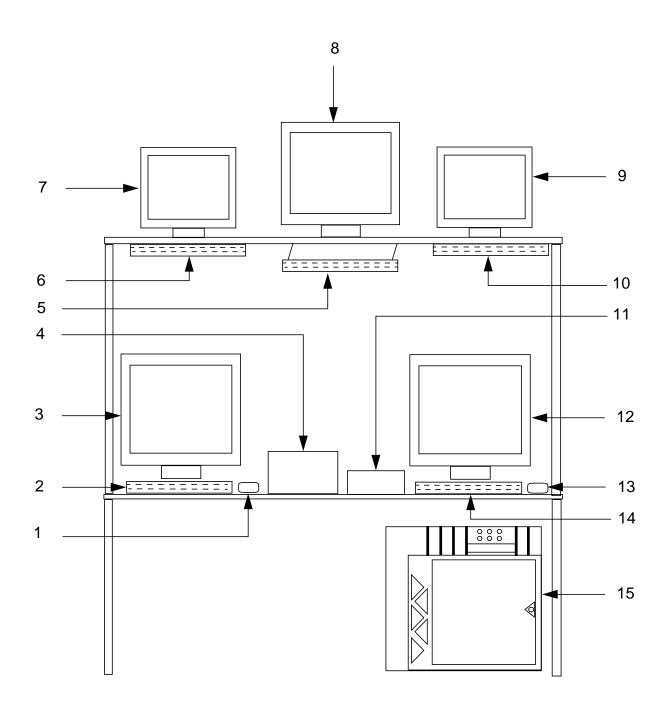
Figure 7-12. Rack 8 Equipment

KEY	DESCRIPTION	REF. DES.
1	Mouse	C3A3A4
2	Keyboard	C3A3A3
3	Monitor, 20 in	C3A3A2
4	StorEdge L280	C3A1A2
5	Keyboard	C1A5A3
6	Keyboard	C1A5A4
7	Monitor, 15 in	C1A5A5
8	Monitor, 19 in	C1A5A2
9	Monitor, 15 in	C1A5A6
10	Keyboard	C1A5A7
11	External Tape Drive 35-70 DLT7000	C3A1A3
12	Monitor, 20 in	C1A4A2
13	Keyboard	C1A4A3
14	Mouse	C1A4A4
15	Ultra Enterprise 450	C3A1A1

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APPENDIX 1

US NDC NOMENCLATURE CROSS-REFERENCE LIST

1A-1.   INTRODUCTION.

1A-2.   Appendix 1 provides a cross-reference list of machines on the United States National Data Center (US NDC) Unclassified and Classified Systems. Table 1A-1 and table 1A-2 list each machine on the Unclassified and Classified Systems, respectively, in order of their Reference Designation (Ref. Des.) number which is listed in the first column. The second and third columns list the functional and machine name for each workstation or equipment item. The last column provides the Internet Protocol (IP) address for each machine.

Table 1A-1. Unclassified System Nomenclature Cross-Reference List

REF. DES.	FUNCTIONAL NAME	MACHINE NAME	IP ADDRESS
U1	**Unclassified Network Subsystem**		
U1A1	Unclassified DAM Station	udam	192.239.137.171
U1A2	DNS/Mail Server	ndcadmin	192.239.137.11
U1A3	Sys/Net/DB Admin Station	usysadmin	192.239.137.157
U1A4	Unclassified Central Network Switch	cat5000	Varies
U1A5	Unclassified C2 Guard Interface	lqmgr	192.239.137.26
U2	**Unclassified Data Acquisition Subsystem**		
U2A1	Diskloop Server	dlsa	192.239.137.60
		dlsa-diode	192.168.102.60
U2A2	Unclassified Console Switch	N/A	N/A
U3	**Unclassified Archive Subsystem**		
U3A1	Unclassified Archive/DB Server	uarch	192.239.137.61

Table 1A-2. Classified System Nomenclature Cross-Reference List

REF. DES.	FUNCTIONAL NAME	MACHINE NAME	IP ADDRESS
C1	**Classified Network Subsystem**		
C1A1	Classified DAM Station	cdam	198.201.84.171
C1A2	Sys/Net Admin Station	sysadmin	198.201.84.147
C1A3	DB Admin Station	dbadmin	198.201.84.148
C1A4	Classified C2 Guard Interface	hqmgr	198.201.84.28
C1A5	Classified C2 Guard Controller	N/A	N/A
C1A6	Classified Central Network Switch	cat5000	Varies
C1A7	Remote Hub	ndchub1	N/A
C1A8	Remote Hub	ndchub2	N/A
C2	**Classified Analysis Subsystem**		
C2A1	Waveform Server	wfsa	198.201.84.109
		wfsa-diode	198.168.102.109
C2A2	Pipeline DB Server	cdbsa	198.201.84.110
C2A3	Classified Console Switch	N/A	N/A
C2A4	Pipeline Processor	pipe1a	198.201.84.61
C2A5	Pipeline Processor	pipe2a	198.201.84.62
C2A6	Pipeline Processor	pipe3a	198.201.84.63
C2A7	Pipeline Processor	pipe4a	198.201.84.64
C2A8	Pipeline Processor	pipe5a	198.201.84.65
C2A9	Pipeline Processor	pipe6a	198.201.84.66
C2A10	Pipeline Processor	pipe7a	198.201.84.67
C2A11	Pipeline Processor	pipe8a	198.201.84.192
C3	**Classified Archive Subsystem**		
C3A1	Classified Archive/DB Server	carch	198.201.84.191
C4	**Classified Analyst/Evaluator Subsystem**		
C4A1	SOM Station	som1	198.201.84.32

Table 1A-2. Classified System Nomenclature Cross-Reference List (Cont)

REF. DES.	FUNCTIONAL NAME	MACHINE NAME	IP ADDRESS
C4	**Classified Analyst/Evaluator Subsystem (cont)**		
C4A2	Analyst Station	analyst1	198.201.84.151
C4A3	Analyst Station	analyst2	198.201.84.152
C4A4	Analyst Station	analyst3	198.201.84.153
C4A5	Analyst Station	analyst4	198.201.84.154
C4A6	Analyst Station	analyst5	198.201.84.155
C4A7	Analyst Station	analyst6	198.201.84.156
C4A8	Evaluator Station	eval1	198.201.84.166
C4A9	Evaluator Station	eval2	198.201.84.167
C4A10	Evaluator Station	eval3	198.201.84.168
C4A11	Evaluator Station	eval4	198.201.84.169
C4A12	Evaluator Station	eval5	198.201.84.170
C4A13	Evaluator Station	eval6	198.201.84.157
C4A14	Evaluator Printer	eval-lp	198.201.84.173
C4A15	Analyst Printer	aoc-lp	198.201.84.172

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APPENDIX 2

US NDC DISK PARTITION TABLES

2A-1.   INTRODUCTION.

2A-2.   Appendix 2 provides disk partition information for the United States National Data Center (US NDC) Unclassified and Classified Systems. Table 2A-1 is an index of the disk partition tables which follow in table 2A-2 through table 2A-14. The index lists the machines alphabetically by name. The Unclassified System machines are listed first, followed by the Classified System machines.

2A-3.   To find the appropriate disk partition information for a particular machine, locate the machine name listed in the first column of table 2A-1, then refer to the corresponding table listed in the second column.

Table 2A-1. US NDC Partition Tables Index

MACHINE NAME	TABLE NUMBER
Unclassified System	
Unclassified DAM Station (udam)	Refer to table 2A-2.
DNS/Mail Server (ndcadmin)	Refer to table 2A-3.
Sys/Net/DB Admin Station (usysadmin)	Refer to table 2A-4.
Unclassified C2 Guard Interface (lqmgr)	Refer to table 2A-5.
Diskloop Server (dlsa)	Refer to table 2A-6.
Unclassified Archive/Database Server (uarch)	Refer to table 2A-7.
Classified System	
Classified DAM Station (cdam)	Refer to table 2A-8.
Sys/Net Admin Station (sysadmin)	Refer to table 2A-4.
DB Admin Station (dbadmin)	Refer to table 2A-4.
Classified C2 Guard Interface (hqmgr)	Refer to table 2A-5.
Waveform Server (wfsa)	Refer to table 2A-9.
Pipeline DB Server (cdbsa)	Refer to table 2A-10.
Pipeline Processors 1 - 7 (pipe1a - pipe7a)	Refer to table 2A-11.
Pipeline Processor 8 (pipe8a)	Refer to table 2A-12

Table 2A-1. US NDC Partition Tables Index (Cont)

MACHINE NAME	TABLE NUMBER
Classified System (cont)	
Classified Archive/Database Server (carch)	Refer to table 2A-13.
SOM Station (som1)	Refer to table 2A-14.
Analyst Stations (analyst1 - analyst6)	Refer to table 2A-14.
Evaluator Stations (eval1 - eval6)	Refer to table 2A-14.

Table 2A-2. Unclassified DAM Station (udam)

PARTITION	STARTING CYLINDER	NUMBER OF BLOCKS	USAGE	LOCATION
c0t0d0s0	0	2388	/	internal, lower slot
c0t0d0s1	2388	345	swap	

Table 2A-3. DNS/Mail Server (ndcadmin)

PARTITION	STARTING CYLINDER	NUMBER OF BLOCKS	USAGE	LOCATION
c0t1d0s7	0	2733	/export/home	internal slot 1
c0t3d0s0	0	2387	/	internal slot 0
c0t3d0s1	2387	345	swap	
c0t4d0s3	0	1	-	U1A2A2, upper right slot
c0t4d0s7	1	3879	/export/disk1	
c0t5d0s3	0	1	-	U1A2A2, upper right slot
c0t5d0s7	1	3879	/export/disk2	

Table 2A-3. DNS/Mail Server (ndcadmin) (Cont)

PARTITION	STARTING CYLINDER	NUMBER OF BLOCKS	USAGE	LOCATION
c1t4d0s3	0	1	-	U1A2A3, upper right slot
c1t4d0s7	1	3879	/export/data	
c1t5d0s3	0	1	-	U1A2A3, upper right slot
c1t5d0s7	1	3879	/export/usndc	

Table 2A-4. Admin Stations (usysadmin, sysadmin, dbadmin)

PARTITION	STARTING CYLINDER	NUMBER OF BLOCKS	USAGE	LOCATION
c0t0d0s0	0	8337	/	internal
c0t0d0s1	8337	555	swap	

Table 2A-5. C2 Guard (lqmgr, hqmgr)

PARTITION	STARTING CYLINDER	NUMBER OF BLOCKS	USAGE	LOCATION
c0t0d0s0	0	456	/	internal, rear slot
c0t0d0s1	456	261	/var	
c0t0d0s3	717	555	swap	
c0t0d0s6	1272	6753	/usr	
c0t0d0s7	8025	867	/export/local	

Table 2A-6. Diskloop Server (dlsa)

PARTITION	STARTING CYLINDER	NUMBER OF BLOCKS	USAGE	LOCATION
c0t0d0s0	2904	2904	/	slot0
c0t0d0s1	0	1452	swap	
c0t0d0s3	1452	1	metadb	
c0t0d0s4	1453	75	/loop1 trans log	
c0t0d0s5	1528	75	/loop2 trans log	
c0t0d0s6	1603	75	/loop3 trans log	
c0t0d0s7	5808	18812	/export	
c0t1d0s3	0	1	metadb	slot1
c0t1d0s7	1	7505	/ora1	
c0t2d0s3	0	1	metadb	slot 2
c0t2d0s7	1	24619	stripe of /loop2	
c0t3d0s3	0	1	metadb	slot 4
c0t3d0s7	1	24619	stripe of /loop3	
c2t0d0s3	0	1	metadb	slot 12
c2t0d0s7	1	7505	/ora1*	
c2t1d0s3	0	1	metadb	slot 13
c2t1d0s7	1	24619	stripe of /loop1	
c2t2d0s3	0	1	metadb	slot 14
c2t2d0s7	1	4923	/ora2*	

Table 2A-6. Diskloop Server (dlsa) (Cont)

PARTITION	STARTING CYLINDER	NUMBER OF BLOCKS	USAGE	LOCATION
c2t3d0s3	0	1	metadb	slot 15
c2t3d0s7	1	24619	stripe of /loop2	
c3t0d0s3	0	1	metadb	slot 16
c3t0d0s7	1	24619	stripe of /loop1	
c3t1d0s3	0	1	metadb	slot 17
c3t1d0s7	1	24619	stripe of /loop2	
c3t2d0s3	0	1	metadb	slot 18
c3t2d0s7	1	4923	/ora3	
c3t3d0s3	0	1	metadb	slot 19
c3t3d0s7	1	24619	stripe of /loop3	
c4t0d0s0	2904	2904	/*	slot 4
c4t0d0s1	0	1452	swap*	
c4t0d0s3	1452	1	metadb	
c4t0d0s4	1453	75	/loop1 trans log*	
c4t0d0s5	1528	75	/loop2 trans log*	
c4t0d0s6	1603	75	/loop3 trans log*	
c4t0d0s7	5308	18812	/export*	
c4t1d0s3	0	1	metadb	slot 5
c4t1d0s7	1	24619	stripe of /loop1	

Table 2A-6. Diskloop Server (dlsa) (Cont)

PARTITION	STARTING CYLINDER	NUMBER OF BLOCKS	USAGE	LOCATION
c4t2d0s3	0	1	metadb	slot 6
c4t2d0s7	1	4923	/ora2*	
c4t3d0s3	0	1	metadb	slot 7
c4t3d0s7	1	24619	stripe of /loop3	
c5t0d0s3	0	1	metadb	slot 8
c5t0d0s7	1	4923	/ora3*	
c5t1d0s3	0	1	metadb	slot 9
c5t1d0s7	1	24619	stripe of /loop3	
c5t2d0s3	0	1	metadb	slot 10
c5t2d0s7	1	24619	stripe of /loop1	
c5t3d0s3	0	1	metadb	slot 11
c5t3d0s7	1	24619	stripe of /loop2	

* mirror

Table 2A-7. Unclassified Archive/Database Server (uarch)

PARTITION	STARTING CYLINDER	NUMBER OF BLOCKS	USAGE	LOCATION
c0t0d0s0	0	1739	/	slot 0
c0t0d0s1	1739	652	swap	
c0t0d0s3	3043	1	metadb	
c0t0d0s4	2391	652	swap	

Table 2A-7. Unclassified Archive/Database Server (uarch) (Cont)

PARTITION	STARTING CYLINDER	NUMBER OF BLOCKS	USAGE	LOCATION
c0t0d0s7	3044	4462	/export	
c0t1d0s7	0	7506	stripe of /export/sam1	slot1
c0t2d0s3	0	1	metadb	slot 2
c0t2d0s7	1	7505	/ora1	
c2t0d0s0	0	1739	/*	slot 12
c2t0d0s1	1739	652	swap*	
c2t0d0s3	3043	1	metadb	
c2t0d0s4	2391	652	swap*	
c2t0d0s7	3044	4462	/export*	
c2t1d0s7	0	7506	stripe of /export/sam1	slot 13
c2t20d0s3	0	1	metadb	slot 14
c2t20d0s7	1	7505	/ora1*	
c3t0d0s3	0	1	metadb	slot 16
c3t0d0s7	1	7505	/ora2	
c3t1d0s7	0	7506	stripe of /export/sam1	slot 17
c3t2d0s3	0	1	metadb	slot 18
c3t2d0s7	1	7505	/ora3	
c4t0d0s3	0	1	metadb	slot 4
c4t0d0s7	1	7505	/ora2*	
c4t1d0s7	0	7506	stripe of /export/sam1	slot 5
c4t2d0s3	0	1	metadb	slot 6

Table 2A-7. Unclassified Archive/Database Server (uarch) (Cont)

PARTITION	STARTING CYLINDER	NUMBER OF BLOCKS	USAGE	LOCATION
c4t2d0s7	1	7505	/ora4	
c5t0d0s3	0	1	metadb	slot 8
c5t0d0s7	1	7505	/ora3*	
c5t1d0s7	0	7506	stripe of /export/sam1	slot 9
c5t2d0s3	0	1	metadb	slot 10
c5t2d0s7	1	7505	/ora4*	

* mirror

Table 2A-8. Classified DAM Station (cdam)

PARTITION	STARTING CYLINDER	NUMBER OF BLOCKS	USAGE	LOCATION
c0t0d0s0	0	1698	/	internal, lower slot
c0t0d0s1	1698	345	swap	
c0t0d0s7	2043	690	/export/local	

Table 2A-9. Waveform Server (wfsa)

PARTITION	STARTING CYLINDER	NUMBER OF BLOCKS	USAGE	LOCATION
c0t2d0s0	0	3636	/	C2A1A3, SCSI ID 2 slot
c0t2d0s1	3636	243	swap	
c0t2d0s3	3879	1	metadb	

Table 2A-9. Waveform Server (wfsa) (Cont)

PARTITION	STARTING CYLINDER	NUMBER OF BLOCKS	USAGE	LOCATION
c0t3d0s1	1	1900	swap	C2A1A3, SCSI ID 3 slot
c0t3d0s3	0	1	metadb	
c0t3d0s7	1901	1979	/export/home	
c0t4d0s3	0	1	metadb	C2A1A3, SCSI ID 4 slot
c0t4d0s7	1	3879	stripe of /log	
c0t5d0s3	0	1	metadb	C2A1A3, SCSI ID 5 slot
c0t5d0s7	1	3879	stripe of /log	
c0t8d0s3	0	1	metadb	C2A1A3, SCSI ID 8 slot
c0t8d0s7	1	3879	stripe of /log	
c1t5d0s7	0	65533	/disk1	A3500
c1t5d2s7	0	65533	/disk2	A3500
c1t5d4s7	0	65533	/disk3	A3500
c2t2d0s0	0	3636	/*	C2A1A3, SCSI ID 2 slot
c2t2d0s1	3636	243	swap*	
c2t2d0s3	3879	1	metadb*	
c2t3d0s1	1	1900	swap*	C2A1A3, SCSI ID 3 slot
c2t3d0s3	0	1	metadb	
c2t3d0s7	1901	1979	/export/ home*	
c2t4d0s3	0	1	metadb	C2A1A3, SCSI ID 4 slot

Table 2A-9. Waveform Server (wfsa) (Cont)

PARTITION	STARTING CYLINDER	NUMBER OF BLOCKS	USAGE	LOCATION
c2t4d0s7	1	3879	stripe of /log*	
c2t5d0s3	0	1	metadb	C2A1A3, SCSI ID 5 slot
c2t5d0s7	1	3879	stripe of /log*	
c2t8d0s3	0	1	metadb	C2A1A3, SCSI ID 8 slot
c2t8d0s7	1	3879	stripe of /log*	
c3t4d1s7	0	65533	/disk4	A3500
c3t4d3s7	0	65533	/disk5	A3500

* mirror

Table 2A-10. Pipeline DB Server (cdbsa)

PARTITION	STARTING CYLINDER	NUMBER OF BLOCKS	USAGE	LOCATION
c0t9d0s0	0	1711	/	C2A2A3, SCSI ID 9 slot
c0t9d0s1	1711	286	swap	
c0t9d0s3	1997	1	metadb	
c0t9d0s4	1998	1169	swap	
c0t9d0s5	3167	1169	swap	
c0t9d0s7	4336	588	swap	
c0t10d0s3	0	1	metadb	C2A2A3, SCSI ID 10 slot
c0t10d0s7	1	4923	/disk2	
c0t11d0s3	0	1	metadb	C2A2A3, SCSI ID 11 slot

Table 2A-10. Pipeline DB Server (cdbsa) (Cont)

PARTITION	STARTING CYLINDER	NUMBER OF BLOCKS	USAGE	LOCATION
c0t11d0s7	1	4923	/disk3	
c0t12d0s3	0	1	metadb	C2A2A3, SCSI ID 12 slot
c0t12d0s7	1	4923	/disk4	
c0t13d0s3	0	1	metadb	C2A2A3, SCSI ID 13 slot
c0t13d0s7	1	4923	/disk5	
c1t9d0s0	0	1711	/*	C2A2A3, SCSI ID 9 slot
c1t9d0s1	1711	286	swap*	
c1t9d0s3	1997	1	metadb	
c1t9d0s4	1998	1169	swap*	
c1t9d0s5	3167	1169	swap*	
c1t9d0s7	4336	588	swap*	
c1t10d0s3	0	1	metadb	C2A2A3, SCSI ID 10 slot
c1t10d0s7	1	4923	/disk2*	
c1t11d0s3	0	1	metadb	C2A2A3, SCSI ID 11 slot
c1t11d0s7	1	4923	/disk3*	
c1t12d0s3	0	1	metadb	C2A2A3, SCSI ID 12 slot
c1t12d0s7	1	4923	/disk4*	
c1t13d0s3	0	1	metadb	C2A2A3, SCSI ID 13 slot
c1t13d0s7	1	4923	/disk5*	

Table 2A-10. Pipeline DB Server (cdbsa) (Cont)

PARTITION	STARTING CYLINDER	NUMBER OF BLOCKS	USAGE	LOCATION
c2t1d0s3	0	1	metadb	C2A2A5, left upper slot
c2t1d0s7	1	3879	stripe of /disk6	
c2t2d0s3	0	1	metadb	C2A2A5, left middle slot
c2t2d0s7	1	3879	stripe of /disk6	
c2t3d0s3	0	1	metadb	C2A2A5, left lower slot
c2t3d0s7	1	3879	stripe of /disk7	
c2t4d0s3	0	1	metadb	C2A2A5, right upper slot
c2t4d0s7	1	3879	stripe of /disk7	
c2t5d0s3	0	1	metadb	C2A2A5, right middle slot
c2t5d0s7	1	3879	stripe of /disk8	
c2t6d0s3	0	1	metadb	C2A2A5, right lower slot
c2t6d0s7	1	3879	stripe of /disk8	
c3t1d0s3	0	1	metadb	C2A2A5, left upper slot
c3t1d0s7	1	3879	stripe of /disk6*	
c3t2d0s3	0	1	metadb	C2A2A5, left middle slot
c3t2d0s7	1	3879	stripe of /disk6*	

Table 2A-10. Pipeline DB Server (cdbsa) (Cont)

PARTITION	STARTING CYLINDER	NUMBER OF BLOCKS	USAGE	LOCATION
c3t3d0s3	0	1	metadb	C2A2A5, left lower slot
c3t3d0s7	1	3879	stripe of /disk7*	
c3t4d0s3	0	1	metadb	C2A2A5, right upper slot
c3t4d0s7	1	3879	stripe of /disk7*	
c3t5d0s3	0	1	metadb	C2A2A5, right middle slot
c3t5d0s7	1	3879	stripe of /disk8*	
c3t6d0s3	0	1	metadb	C2A2A5, right lower slot
c3t6d0s7	1	3879	stripe of /disk8*	

Table 2A-11. Pipeline Processors (pipe1a - pipe7a)

PARTITION	STARTING CYLINDER	NUMBER OF BLOCKS	USAGE	LOCATION
c0t0d0s0	0	2388	/	internal, lower slot
c0t0d0s1	2388	345	swap	
c0t0d0s7	0	2733	/disk1	internal, upper slot

Table 2A-12. Pipeline Processor (pipe8a)

PARTITION	STARTING CYLINDER	NUMBER OF BLOCKS	USAGE	LOCATION
c0t0d0s0	0	1672	/	slot 0
c0t0d0s1	1672	293	swap	
c0t0d0s3	1965	1	metadb	
c0t0d0s7	1966	2958	/disk1	
c0t2d0s3	0	1	metadb	slot 2
c0t2d0s7	1	4923	/disk2	
c2t0d0s0	0	1672	/*	slot 4
c2t0d0s1	1672	293	swap*	
c2t0d0s3	1965	1	metadb	
c2t0d0s7	1966	2958	/disk1*	
c2t2d0s3	0	1	metadb	slot 6
c2t2d0s7	1	4923	/disk2*	

* mirror

Table 2A-13. Classified Archive/Database Server (carch)

PARTITION	STARTING CYLINDER	NUMBER OF BLOCKS	USAGE	LOCATION
c0t0d0s0	0	1739	/	slot 0
c0t0d0s1	1739	652	swap	
c0t0d0s3	3043	1	metadb	
c0t0d0s4	2391	652	swap	
c0t0d0s5	3044	45	unused	

Table 2A-13. Classified Archive/Database Server (carch) (Cont)

PARTITION	STARTING CYLINDER	NUMBER OF BLOCKS	USAGE	LOCATION
c0t0d0s7	3089	4417	/export	
c0t1d0s3	0	1	metadb	slot 1
c0t1d0s7	1	24619	/ora1	
c0t2d0s7	0	7506	strip of /export/sam1	slot 2
c0t3d0s7	1	7506	strip of /export/sam1	slot 3
c2t0d0s0	0	1	metadb	slot 12
c2t0d0s1	1	24619	/ora1*	
c2t1d0s3	0	1	metadb	slot 13
c2t1d0s7	1	7505	/ora3	
c2t2d0s7	0	7506	strip of /export/sam1	slot 14
c2t3d0s7	1	7506	strip of /export/sam1	slot 15
c3t0d0s3	0	1	metadb	slot 16
c3t0d0s7	1	7505	/ora4	
c3t1d0s3	0	1	metadb	slot 17
c3t1d0s7	1	7505	/ora2	
c3t2d0s7	0	7506	strip of /export/sam1	slot 18
c3t3d0s7	0	7506	strip of /export/sam1	slot 19
c4t0d0s0	0	1739	/*	slot 4
c4t0d0s1	1739	652	swap*	
c4t0d0s3	3043	1	metadb	

Table 2A-13. Classified Archive/Database Server (carch) (Cont)

PARTITION	STARTING CYLINDER	NUMBER OF BLOCKS	USAGE	LOCATION
c4t0d0s4	2391	652	swap*	
c4t0d0s5	3044	45	unused*	
c4t0d0s7	3089	4417	/export*	
c4t1d0s3	0	1	metadb	slot 5
c4t1d0s7	1	7505	/ora2*	
c4t2d0s7	0	7506	strip of /export/sam1	slot 6
c4t3d0s7	0	7506	strip of /export/sam1	slot 7
c5t0d0s3	0	1	metadb	slot 8
c5t0d0s7	1	7505	/ora4*	
c5t1d0s3	0	1	metadb	slot 9
c5t1d0s7	1	7505	/ora3*	
c5t2d0s7	0	7506	strip of /export/sam1	slot 10
c5t3d0s7	0	7506	strip of /export/sam1	slot 11

* mirror

Table 2A-14. SOM Station, Analyst Stations and Evaluator Stations
(som1, analyst1 - analyst6, eval1 - eval6)

PARTITION	STARTING CYLINDER	NUMBER OF BLOCKS	USAGE	LOCATION
c0t0d0s0	0	8323	/	internal, rear slot
c0t0d0s1	8323	6242	swap	
c0t0d0s7	14565	24968	/export	

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APPENDIX 3

APPLICATION PROCESSES AND LOG FILE LOCATIONS

3A-1. INTRODUCTION.

3A-2.   Table 3A-1 is a list of the United States National Data Center (US NDC) application processes and log file locations. The first column lists the machine name. The second column identifies the processes which run on the machines listed in column one. The third column provides the location of the log file for each process identified in column two.

Table 3A-1. US NDC Application Processes and Log File Locations

MACHINE NAME	PROCESS	LOG FILE LOCATION
UNCLASSIFIED DATA ACQUISITION		
dlsa	putfiled	/data/dlsa/log/putfiled.YYYYDOY*
	artm	/data/dlsa/data4/LANL/status/artm.log
	feed_file2alpha	/data/dlsa/log/feed_file2alpha
	clean.ASN.dirs	/data/dlsa/log/clean.ASN.dirs.YYYYDOY*
	clean.ASN.files	/data/dlsa/log/clean.ASN.files.YYYYDOY*
	clean.LANL.data.dirs	/data/dlsa/log/clean.ASN.files.YYYYDOY*
	clean.LANL.data.files	/data/dlsa/log/ clean.LANL.data.files.YYYYDOY*
	clean.LANL.files	/data/dlsa/log/clean.LANL.files.YYYYDOY*
	clean.f2a	/data/dlsa/log/clean.f2a.YYYYDOY*
	clean.f2a.DONE	/data/dlsa/log/clean.f2a.DONE.YYYYDOY*
	getreb	/data/dlsa/log/getreb.YYYYDOY*
	diode_send	/data/dlsa/log/diode_send
	update_interval	/data/dlsa/log/update_interval
	send_interval	/data/dlsa/log/send_interval
	file_send	/data/dlsa/log/file_send

Table 3A-1. US NDC Application Processes and Log File Locations (Cont)

MACHINE NAME	PROCESS	LOG FILE LOCATION
UNCLASSIFIED DATA ACQUISITION (CONT)		
dlsa(cont)	AlphaDLHeap11 and AlphaDLHeap21 and AlphaDLHeap31	/data/dlsa/log/AlphaDLHeap11 and /data/dlsa/log/AlphaDLHeap21 and /data/dlsa/log/AlphaDLHeap31
	AlphaForward11 and AlphaForward21 and AlphaForward31 and AlphaForward12 and AlphaForward22 and AlphaForward32	/data/dlsa/log/AlphaForward11 and /data/dlsa/log/AlphaForward21 and /data/dlsa/log/AlphaForward31 and /data/dlsa/log/AlphaForward12 and /data/dlsa/log/AlphaForward22 and /data/dlsa/log/AlphaForward32
	AlphaToDiode13 and AlphaToDiode23 and AlphaToDiode33	/data/dlsa/log/AlphaToDiode13 and /data/dlsa/log/AlphaToDiode23 and /data/dlsa/log/AlphaToDiode33
	ConnMan_sockd	/data/dlsa/log/ConnMan_sockd
	ConnMan	/data/dlsa/log/ConnMan
	DLMan11 thru DLMan15 and DLMan21 thru DLMan25 and DLMan31 thru DLMan35	/data/dlsa/log/DLMan/DLMan# (where # = the sequentially assigned number 11 through 15, 21 through 25 and 31 through 35 which corresponds to the DLMan process number in column 2)
	file2alphaBDFB	/data/dlsa/log/file2alpha.BDFB
	file2alphaCPUP	/data/dlsa/log/file2alpha.CPUP
	file2alphaCMAR	/data/dlsa/log/file2alpha.CMAR
	dtc2alpha415	/data/dlsa/log/dtc2alpha.415
	process_ascii_workflow	/data/dlsa/log/process_ascii_workflow
	GapReconcile	/data/dlsa/log/GapReconcile
	file2alphaDBIC	/data/dlsa/log/file2alpha.DBIC
	file2alphaVNDA	/data/dlsa/log/file2alpha.VNDA
	file2alphaAUAR	/data/dlsa/log/file2alpha.AUAR
	dtc2alpha421	/data/dlsa/log/dtc2alpha.421
	Gap_Requeue_NDC_HA	/data/dlsa/log/Gap_Requeue_NDC_HA

Table 3A-1. US NDC Application Processes and Log File Locations (Cont)

MACHINE NAME	PROCESS	LOG FILE LOCATION
UNCLASSIFIED DATA ACQUISITION (CONT)		
dlsa(cont)	file2alphaLBTB	/data/dlsa/log/file2alpha.LBTB
	file2alphaLPAZ	/data/dlsa/log/file2alpha.LPAZ
	dtc2alpha079	/data/dlsa/log/dtc2alpha.079
	file2alphaBGCA	/data/dlsa/log/file2alpha.BGCA
	file2alphaPLCA	/data/dlsa/log/file2alpha.PLCA
	file2alphaSGAR	/data/dlsa/log/file2alpha.SGAR
	file2alphaKAR	/data/dlsa/log/file2alpha.KAR
	file2alphaTT	/data/dlsa/log/file2alpha.TT
	file2alphaATTU	/data/dlsa/log/file2alpha.ATTU
	file2alphaBMAR	/data/dlsa/log/file2alpha.BMAR
	file2alphaSOAR	/data/dlsa/log/file2alpha.SOAR
	file2alphaIMAR	/data/dlsa/log/file2alpha.IMAR
	file2alphaBCAR	/data/dlsa/log/file2alpha.BCAR
	file2alphaALAR	/data/dlsa/log/file2alpha.ALAR
	dtc2alpha313	/data/dlsa/log/dtc2alpha.313
	dtc2alpha460	/data/dlsa/log/dtc2alpha.460
	file2alphaBOSA	/data/dlsa/log/file2alpha.BOSA
	file2alphaBRAR	/data/dlsa/log/file2alpha.BRAR
	file2alphaBRLAR	/data/dlsa/log/file2alpha.BRLAR
	file2alphaCBAR	/data/dlsa/log/file2alpha.CBAR
	file2alphaILAR	/data/dlsa/log/file2alpha.ILAR
	file2alphaFLAR	/data/dlsa/log/file2alpha.FLAR
	file2alphaKSAR	/data/dlsa/log/file2alpha.KSAR
	dtc2alpha244	/data/dlsa/log/dtc2alpha.244

Table 3A-1. US NDC Application Processes and Log File Locations (Cont)

MACHINE NAME	PROCESS	LOG FILE LOCATION
UNCLASSIFIED DATA ACQUISITION (CONT)		
dlsa(cont)	dtc2alpha301	/data/dlsa/log/dtc2alpha.301
	dtc2alpha452	/data/dlsa/log/dtc2alpha.452
uarch	ArchiveLongTerm	/data/dlsa/log/archive/ArchiveLongTerm
	ArchivePermanent	/data/dlsa/log/archive/ArchivePermanent
	ArchiveClean	/data/dlsa/log/archive/ArchiveClean
CLASSIFIED DATA ACQUISITION		
carch	ArchiveLongTerm	/data/wfsa/log/archive/ArchiveLongTerm
	ArchivePermanent	/data/wfsa/log/archive/ArchivePermanent
wfsa	rt_reader	/data/wfsa/log/da/diode/rt_reader
	diode_recv	/data/wfsa/log/da/diode/diode_recv
	DiodeToAlpha	/data/wfsa/log/da/DiodeToAlpha1
	file_recv	/data/wfsa/log/diode/file_recv
	recv_interval	/data/wfsa/log/da/recv_interval
	update_interval	/data/wfsa/log/da/update_interval
	ConnMan_sockd	/data/wfsa/log/da/ConnMan_sockd
	ConnMan	/data/wfsa/log/da/ConnMan
	AlphaForward1	/data/wfsa/log/da/AlphaForward1
	AlphaForward2	/data/wfsa/log/da/AlphaForward2
	AlphaForward3	/data/wfsa/log/da/AlphaForward3
	AlphaForward4	/data/wfsa/log/da/AlphaForward4
	AlphaForward5	/data/wfsa/log/da/AlphaForward5
	AlphaForward6	/data/wfsa/log/da/AlphaForward6
	AlphaForward7	/data/wfsa/log/da/AlphaForward7
	AlphaDLHeap10	/data/wfsa/log/da/AlphaDLHeap10
	DLMan1	/data/wfsa/log/da/DLMan/DLMan1

Table 3A-1. US NDC Application Processes and Log File Locations (Cont)

MACHINE NAME	PROCESS	LOG FILE LOCATION
CLASSIFIED DATA ACQUISITION (CONT)		
wfsa(cont)	DLMan2	/data/wfsa/log/da/DLMan/DLMan2
	DLMan3	/data/wfsa/log/da/DLMan/DLMan3
	DLMan4	/data/wfsa/log/da/DLMan/DLMan4
	DLMan5	/data/wfsa/log/da/DLMan/DLMan5
	DLMan6	/data/wfsa/log/da/DLMan/DLMan6
	GapSummary	/data/wfsa/log/da/GapSummary.YYYYDOY*

*Where YYYY = year and DOY = day of year.

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